T-EFFECT—A NEW PHENOMENON

FLYING

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MARCH

35 CENTS

PIPER TRI-PACER 160

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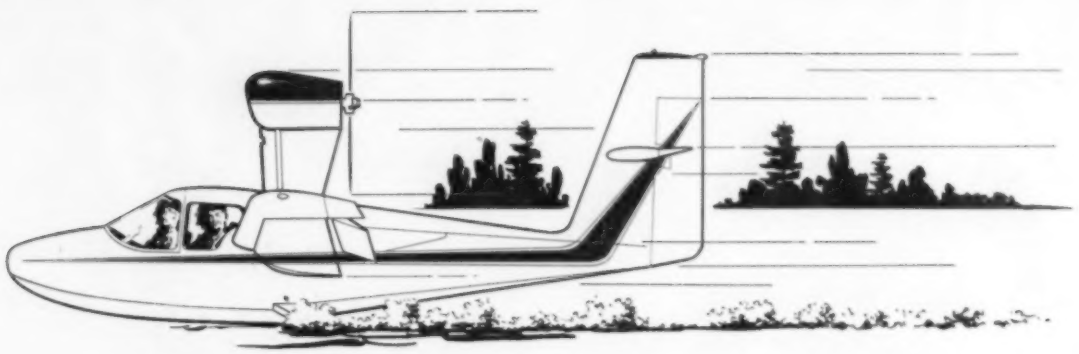
FROM KANSAS TO COSMOS

An AF pilot from Kansas flies the guided missile range across the Spanish Main

★

SALUTE TO PHOENIX

Flight training in the Phoenix School system



You've got to fly it to believe it

It's the 1958 *4-Place* Skimmer Amphibian
With a Completely New Kind of Performance

Fly the Skimmer Tach IV from land or water and your interest in amphibians will take off in a wonderful *new* direction. That's the only way to buy *any* airplane: fly it and let *it* convince you—if it can.

We'll bet on the Skimmer any day in the week.

Power and Performance—Set the throttle and you can taxi the Skimmer like a motor boat . . . up wind . . . down wind . . . cross wind. Its true marine hull rides the waves like a boat. And the wind won't tip it on a turn—because the wing floats rest firmly on the *surface* of the water.

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All in all, that makes the Skimmer a "natural" for getting in and out of tight places . . . like small airports and lakes . . . even ponds and bayous.

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Once its wheels touch the runway, or its hull brushes the water, the Tach IV is *in*. All you need to do is to guide it "home" and cut the power.

More Room, More Visibility—Another thing you'll like about the Skimmer is the roomy interior—with the wide seats that give you *extra* shoulder room. You'll like the wider visibility, too, because in the Skimmer you sit forward of the wing. That means you can see up . . . down . . . and almost all the way around.

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It is also made to take salt spray day in and day out. For every piece of metal in the Skimmer is completely alidined and chromated *before* it reaches the assembly line. This assures you that all "hidden corners" and metal overlaps in the finished plane are protected against corrosion.

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FLYING®

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THE COVER: This inviting aspect of the 1958 Tri-Pacer 160 on Edo floats was photographed by Howard Levy. (Read Check Pilot Report, page 42.)

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MAILBOX

PRO'S NEST

With much interest I absorbed the article, "If You Lose an Engine" by Mr. T. L. Teate in the December issue of FLYING.

I am one of those persons, who just this month, acquired my multi-engine rating. However, I feel this is just a legal permit and the great deal of knowledge that must be acquired to become proficient has to come through experience and plain good advice. I believe Mr. Teate's article is very beneficial as a follow-up guide.

I took my training from Airflite, Inc., Municipal Airport, Wichita, Kan., under the able instruction of Airflite's president, Joseph Boyle, former test pilot for Beech Aircraft for 11 years; and I am now employed by Airflite.

The procedure in Mr. Teate's article sounded very familiar and his valuable information on trim control shall be remembered.

J. M. ALEXANDER

Wichita, Kan.

INSTRUMENT TIME FOR PRIVATE PILOTS

In answer to V. L. Owens and Harvey O. Dow (Mailbox, Nov. 1957), I couldn't disagree more.

Why burden a student struggling for his private rating with instrument time? Let him get the rating and then proceed with some instrument work—we usually go to grade school *before* going to high school. In the meantime, see that he gets a half hour or so of real IFR flying with a rated pilot. That will show him what "soup" is like and help to keep his neck intact until he does get his instrument dual.

As for all the licensed aircraft having primary panels, just what are we supposed to do with them in our spray planes?

ALFRED W. MILLER

Miller Air Service,
Bowman, N. D.

RADIO FREQUENCIES

Congratulations for a fine magazine. I read each issue from cover to cover . . .

I especially enjoyed the article "Radio Frequencies" in the November issue and would like to see more like it.

JIMMY SPRADLEY

Patsburg, Ala.

FLY YOURSELF PLAN

Reference is made to the article "Fly Yourself Plan" by Ted Durosko, in December FLYING.

We are certainly in accord with any plan that will encourage more persons to utilize the airplane for business or pleasure but we question if it is good for business if a reasonable profit cannot be shown for our efforts.

We operate Cessna 172's for charter, instruction and rental, and would like to have some concrete figures to substantiate the rate which is claimed in the aforementioned article.

. . . We have been reading FLYING for as long as we can remember and will never be without it as long as it is published. We would not have your magazine changed, we like it as it is!

RALPH M. HORN

Lakes Region Flying Service
Wolfeboro, N. H.

SAME MOUNTAIN

Reading your article "High Mountain Pilot" in your December issue, it came to my attention that you have used in the picture showing Mr. Geiger and his Super Cub the less known name Mont Cervin, in identifying the mountain in background. The readers of FLYING might be interested to know that the more popular

name for this majestic mountain is Matterhorn.

Otherwise thanks for a good magazine.

HARTWIG BERNDL

Kitimat, B. C.

• *Quite true. The German name is Matterhorn; the French call it Mont Cervin and the Italians, Monte Cervino. Located on the Swiss-Italian border six miles southwest of Zermatt, this mountain is indeed better known as the Matterhorn.*—ED.

COURTESY PLUS

Last Fall one of our students made a forced landing at Naugatuck, Conn. about five miles from the Bethany Airport and we would like to thank Bob Jones for the wonderful treatment and cooperation we received from him.

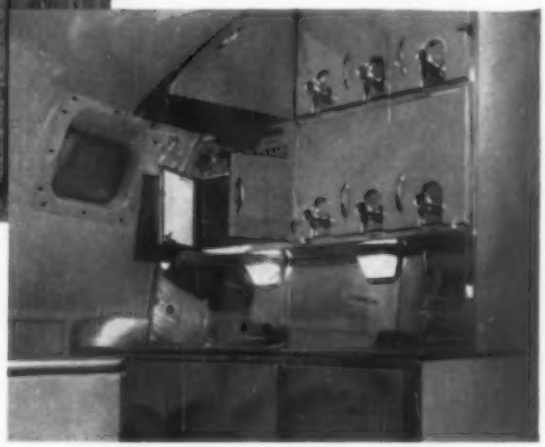
The plane landed in the swamp at an 80-degree angle with the propeller bent in half resting about a foot above the mud and suspended by trees. We did our Abe Lincoln bit, cut a swath 60 feet long and nine wide to a clearing, got the plane to Bob Jones' field and dumped it there.

Bob was out on an IFR trip to Block Island and when he got back was pretty well tuckered out. (Not that he didn't

(Continued on page 8)

LOUNGES and GALLEYS
TO INDIVIDUAL AIRLINE REQUIREMENTS

DC-6 and DC-7 LOUNGE UNITS typical of those designed, engineered, and installed by AiResearch Aviation Service for some of the world's leading airlines, including American, Pan American, Swissair, Braniff, KLM, Panagra, CPA and Japan. Berthable and curved lounges are fabricated on a production basis by highly experienced personnel.



GALLEY installation in DC-6, fabricated to customer specifications. All galley and buffet units are made of lightweight materials and can withstand loads up to 12 G's. Equipment may include electric ranges, broiler and oven units, refrigerators, dry ice storage, liquid containers and coffee makers.

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BY *Champion* WORLD'S
FINEST TRAINING, UTILITY
AND BUSINESS PLANES.

CHAMPION AIRCRAFT CORPORATION
Osceola, Wisconsin

MAILBOX

(Continued from page 6)

have company, for we gave up our wood-chopping days long ago.) Despite this he gave us every assistance and a resting place for our battered Cessna 140. When the boys from our club went up to tow the plane to home base he refused reimbursement with "why knock a man when he's down."

Bob Jones is so typical of the ideals that our flying club, and the New Jersey State Flying Club Assoc., has been trying to promote. The Paramus Flying Club, Inc. says "Thanks Bob."

MELFORD J. FABRIKANT, Sec'y.
Paramus, N. J.

• *The New Jersey Flying Club Assoc. is a new state organization with about 15 members. Its president and founder, Charles Moraller of the successful Jersey Aero Club, Asbury Park Airport, N. J., and also the above writer, are most anxious to get all New Jersey pilots back of this worthwhile organization.*—ED.

SKY DIVER

I am a Sky Diver. My parachuting experience began very shortly after I read your article "Sky Dive to Moscow" in the April 1956 issue. I lost that issue and the author, Jacques Istel, sent me a reprint. Now this is pretty well weather beaten and worn from use. My jump Club has studied the tear-sheets until the printing is almost worn off. Could you possibly send me another?

To the best of my knowledge, FLYING was the first publication to print a story on this new sport. Have I missed any more recent articles?

BUD SELLICK, V.P.
McMinn Parachuting Assoc.,
Maryville, Tenn.

• *We have not yet printed follow-up story on Sky Diving, but Jacques Istel is now at work on one.*—ED.

VOICE FROM THE CONTROL CENTER

After hearing so much about all that everyone is doing to create a new Air Traffic Control System, I would like to suggest only one way in which the present system could be improved. Having some experience in this field both in the military and with the civil end of it, I find all too frequently where the military misuse an IFR flight plan.

I am referring to instances where a military pilot will file IFR x-country, direct route, altitude "one thousand on top." As almost everyone knows an assignment of such a cruising altitude leaves all the separation directly up to the pilot. This then cannot be the reason they choose to fly this type of plan. The ARTC Centers must however follow this flight to its destination and estimate such fixes along the route that are appropriate. This in turn requires quite a few interphone minutes especially if the flight is a long one.

What then is the military pilot looking for if not separation? Is he looking for a dispatching service to serve him along his route? I doubt that as the military has its own Military Flight Service, and the CAA has its network of Air Traffic Communications Stations to supply him with all the assistance he needs such as Search and Rescue.

While the pilot of such a flight is not helping himself, he is in a small way detracting from the efficiency of all Traffic Control Centers across the country in that he needlessly ties up communications, and makes more work for the controllers whose workload is already overtaxed. . . .

Perhaps if all pilots, both civilian and military, were advised of this situation they would file IFR only when they intended to fly IFR. This possibly would alleviate some enroute delays as well as terminal delays for all. At least it would be a step in the right direction.

JAMES A. DURFEE
Detroit ARTC Center.

• *This is an ATC viewpoint. It would be interesting to hear from the Military on this "see and be seen" subject.*—ED.

P-26'S IN GUATEMALA

The "Briefings" column of the December issue of FLYING shows a picture of a Boeing P-26-A acquired by the Air Museum in Claremont, Calif., with a notation that the museum's curator said it is the only one of its type in existence.

The Guatemalan airforce has several Boeing P-26's at LaAurora air field at Guatemala City.

DON FERRELL
Oklahoma City, Okla.

• *Are they P-26-A's?*—ED.

NAVY MAN'S S.O.S.

Recently, while home on leave, I decided to take flying lessons, something I had wanted to do for years.

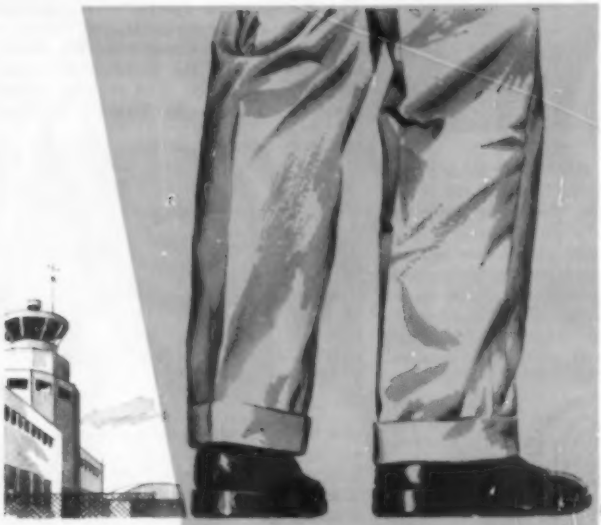
After seven hours and 30 minutes, my instructor let me solo just three days before Christmas. That was the best Christmas I have had in a long time.

Upon returning to my ship (*USS Essex* CVA-9) I talked with the Chaplain about starting a flying club. He agreed to help but neither of us knew where or how to start.

I have been a reader of FLYING for a long time and I knew that FLYING and its many readers could give me the information. All the information will be sincerely appreciated.

WILLIAM R. GODWIN AN
S-1 Div. USS Essex
% FPO, New York, N. Y.

(Continued on page 86)



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Briefings . . .

HERMAN GEIGER, world-famous "glacier pilot" who has made 10,000 landings on glaciers in the Swiss Alps in his Piper Super Cub, participates, with a group of Swiss pilots, in the landing of a Helio Courier, four-place American-built STOL

aircraft, on Zanfleuron Glacier near Sion, Switzerland. With Mr. Geiger (left) is Mr. Spalt, president of the Valais section of the Swiss Aero Club. This is said to be the first time a four-place aircraft with full load has landed and taken off from a glacier in Switzerland.

CHAMPION AIRCRAFT, Osceola, Wis., manufacturers of the 95-hp Tri-Traveler and Traveler light planes, has added two new models to its line for 1958. Designated the "DX'er" and "Sky-Trac," each will feature the 140 hp Lycoming engine, and sell in the price range of $6,500. The Sky-Trac is designed for greater utility in the patrol and agricultural fields; the DX'er as a low-priced business aircraft.

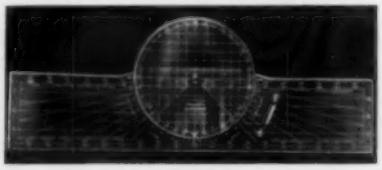
WHEN AMERICAN AIRLINES recently inaugurated its new luxury "Captain's Flagship" flights between Detroit and New York, the plane used for the inaugural flight was appropriately christened with

champagne. Called upon to do the honors were Mrs. Gene Burns (with the champagne) wife of AA Capt. Gene Burns (center); and Mrs. Ray Russom, wife of another AA flight captain also assigned to this special service.

PURCHASE OF THE ENTIRE STOCK of Riley Twin Navions from Temco Aircraft of Dallas has been announced by Vest Aircraft Co., Sky Ranch Airport, Denver. The purchase included nine new planes and four demonstrators for a total price of around a quarter million dollars. Vest is offering the new planes for sale at approximately the price of some of the standard single engine planes now on the market. Powered with two Lycoming 170 hp engines, the Temco Riley Twins have a range of 1,400 miles and cruising speed of 180 mph. They are equipped with wingtip tanks and Horton and Horton custom interiors.

AERONAUTICAL ELECTRONICS, INC., Raleigh, N. C., manufacturers of *Aerotron* two-way VHF communications equipment, is in production on their new Model 500 series equipment. The new set consists of a 10-watt VHF transmitter and a crystal-controlled, dual conversion VHF receiver of advanced design and is capable of operation from 6 to 12 volts DC or 115 volts, 60 to 400 cycles, AC without modification. Licensed by FCC for industrial radio uses (including airport Unicom) it is priced at $299.50 complete with crystals, power cable and local-area whip antenna. It is now available from factory or distributors.

NEW BLACKBOARD MODEL of Warner Instrument's Navigational Plotter has been developed as an easy-to-use instrument in classroom discussions on navigational problems. The plotter can be used



for plotting courses and bearing lines, measuring distances and numerous other related subjects. Further details will be forthcoming by writing Warner Instrument & Sales Co., 4734 N. Austin Ave., Chicago 30, Ill.

DEVELOPMENT OF A NEW 50-watt VHF transmitter for ground-to-air voice communication and VOR service is announced by Collins Radio. Called the 242F-5, the new model offers continuous operation in the 108-152 mc range and features adjustable carrier output to any level from 10 to rated 50 watts. Although a single channel transmitter, the 242F-5 offers up to four channels within a 500 kc spectrum as an optional feature.

INTRODUCTION of the new series 800 spark plug cleaner and tester, incorporating many advanced features, has been made by Champion Spark Plug. Series 800 is available through Champion wholesalers.

BY DESIGNING a special pilot's helmet with a remote-controlled, built-in camera attached, Convair at Ft. Worth has finally solved the problem of getting flight footage of the B 58 Hustler supersonic bomber. George Davis here, Con-

vair test pilot, wears the new helmet-camera as he prepares to take off in a TF-102A to fly chase for a B-58 flight. Davis is able to frame his picture by sighting through the little finder that is placed in front of his right eye.

AT FARES 20 per cent below current air tourist fares, a new "economy" service is being inaugurated by the scheduled international airlines beginning April 1. According to IATA (International Air Transport Assoc.), the economy-sized fares will be $252 one way and $453.60 round trip on the basic New York-London route and will vary somewhat between other North Atlantic gateway cities. Aircraft seating on this service will be less spacious, food service simple and no alcoholic beverages served or sold. Tourist and first class fares, on the other hand, go up $35 and $25, respectively.

FLYING AN ARMY YH-41 "Seneca" helicopter at Wichita, Kan., in late December, Capt. James E. Bowman of the Army Aviation Board, Ft. Rucker, Ala., set three new world helicopter altitude records—30,355 ft. in two weight cate-

gories and 28,200 ft. in a third weight class. The YH-31, a product of Cessna and currently being evaluated by the Army, captured the previous record of 26,932 ft. from the French gas turbine-powered Alouette established in 1955.

MOVING ALONG IN HIGH GEAR, with the U.S. program to modernize and improve the nation's airports, the CAA made grant offers in connection with 135 projects for a total in Federal funds of $19,151,152 during the four-month period between

(Continued on page 90)

FLY WEATHER-WISE — Mobil

These weather items prepared in consultation with the United States Weather Bureau

TEMPERATURE VARIATIONS

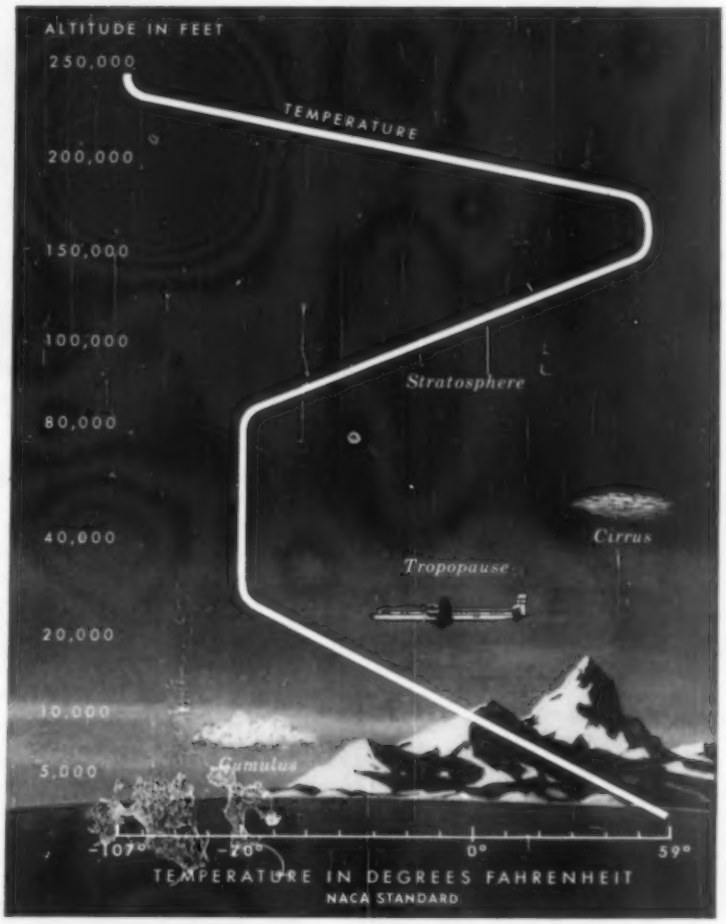
IN RELATION TO ALTITUDE...

TEMPERATURES encountered in a single flight may vary as much as 130°F. or more. These variations are associated with altitude and weather patterns and can affect flight performance.

Temperature and altitude—Heat from the earth warms the atmosphere with steadily decreasing effect as altitude increases. Temperature normally decreases with altitude at the rate of 3½°F. per 1000 ft. At the tropopause (top of troposphere) temperature remains almost constant up to 80,000 ft. Therefore, modern aircraft encounter coldest air in the tropopause layer which varies from about 28,000 ft. in the polar air masses to 54,000 ft. in the tropical.

As altitude increases from approximately 80,000 ft. to 150,000 ft., the temperature returns to almost sea level condition. This is the result of strong absorption of the sun's ultra-violet rays in the layer of ozone gas at very high altitudes.

At still higher altitudes, the temperature reverts to extreme cold.



FORECAST: *Top Flight Performance with Mobil Aero Hydraulic Oils and Mobilgrease Aero!*

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Mobilgrease Aero Lo-Temp and General Purpose—These Aero greases help assure smooth operation of all sliding and rolling surfaces of aircraft parts . . . control systems, bearings, and gears.

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GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

Leading airlines freely exchange ignition

Divided into six half-day sessions, the Champion-sponsored ignition conferences follow an agenda of questions submitted in advance by participants. Each session is guided by one of six chairmen, all of whom represent airlines. This year's chairmen are pictured above.

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Aero Engine Laboratory
Allegheny Airlines
American Airlines, Inc.
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Trans World Airlines
United Air Lines, Inc.
United States Army
United States Navy
Vapor Blast Manufacturing
Wright Aeronautical Division

Walter J. Krissek of Trans World Airlines was chairman of the first session, which dealt with "Spark Plug Service Experience," also served as a chairman in '56.

Delta Air Line's **Dean Miller,** serving as a conference chairman for the first time, headed the session concerning "Recondition, Test and Inspection of Spark Plugs."

George E. Roycraft of North Central Airlines, the only other first-time chairman, presided over the second meeting dealing with "Spark Plug Service Experience."

(Advertisement)

experience for improved engine performance

FOR 13TH STRAIGHT YEAR, AIRLINE ENGINEERS HOLD 3-DAY QUESTION SESSION WITH IGNITION EXPERTS AT CHAMPION-SPONSORED CONFERENCE IN TOLEDO

Because scheduled airlines constantly seek ways to make their already excellent engine performance even better, an unusual conference takes place in Toledo each year.

In this conference, business competitors openly discuss all aspects of the operation, maintenance and performance of their aircrafts' ignition systems. Without reservation, they answer all questions – freely passing along know-how and experience that may have cost hundreds of man-hours and thousands of engine-hours to acquire.

Manufacturers of engines and engine parts also take an active part in these discussions, making available all the ignition information in their possession.

The Champion Spark Plug Company, sponsor of these conferences, wishes to thank all concerned for their contributions.

CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

American Airlines' **C. C. Mitchell** headed session on "Research and Development," "Ignition Analyzers," "Magnetos, Harness, Leads," was also a chairman in 1956.

A. A. Weigand from Eastern Air Lines, a chairman in 1956, conducted the discussions on "Spark Plug Fouling" and "Effects of Fuel and Lubricants on Spark Plugs."

Trans Canada Airlines was represented by **Alex Weber,** who presided over the talks on problems of "Jet Ignition," also served as chairman in 1947 and 1948.

(Advertisement)

HANGAR FLYING

INVISIBLE KILLER

YOU READ frequently about carbon monoxide poisoning in automobiles but seldom hear of it in aircraft where obviously it is much more dangerous. You can't open the door and step out. Listen to my tale of a close call.

I had flown to New York on business from my home in Nebraska and, while stopping in Detroit for gasoline, experienced a slight headache. I felt that this was due to sitting still during the few hours of flight or perhaps to a meal missed that day.

I thought nothing more of it until arriving in N. Y., when I realized that my headache worsened. It was so bad I decided that the grip, flu, or other virus must be causing the migraine. I went to bed early and 12 hours later awoke feeling fine. I assumed, therefore, that I had nipped in the bud whatever was trying to plague me and went about my business.

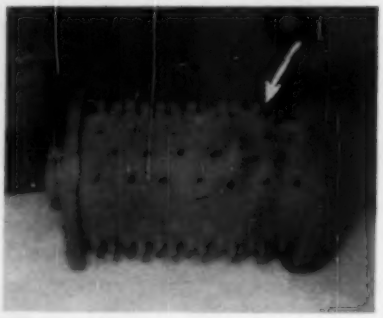
Later that day, I took off for home. This time, I stopped in Buffalo and Chicago, noticing in Chicago that the headache was developing again. Once again I thought it may have been caused by diet. On the last leg of my trip home, however, it got really severe, and the thought of carbon monoxide poisoning finally dawned on me. I opened the air vents as best I could in the ten below weather after deciding it would be better to freeze to death than to inhale more gas.

I continued the flight, figuring that if I landed in Moline, Ill., or Des Moines, Iowa, I would have to put myself on somebody's doorstep and say, "Please take me to a hospital." But if I could hold out for another half hour, I would make it back home where it would be easier to arrange for somebody to worry about the plane and me. As a test of my reactions, I concentrated on the very small type that appears on aircraft instruments —the manufacturer's name, serial number, etc. As long as I could read it, I could continue flying to my home base.

To make a long story short, I landed safely at home where a doctor diagnosed a mild carbon monoxide poisoning. He gave me about one hour of oxygen along with aspirin, which slowly dissipated the headache (it really didn't disappear this time for a day and a half).

The aircraft, incidentally, had undergone a 100-hour inspection, including check of the heater muff 14 hours prior to this incident. The A&E who normally performed maintenance said this was the first time he had ever seen a stainless steel unit give difficulty. As the photograph below shows, raw exhaust gases passed through the hole of the muff into the cabin.

The moral I draw is to keep alert for manifold leaks while flying in wintertime, and let him who has a simple device to spot carbon monoxide sell it to us pilots. I don't want a repeat on my experience!



Arrow points at hole in the heater muff through which monoxide seeped into cabin.

JACK BESTIC

Wheeler AFB, T. H.

STORMY CROSS-COUNTRY

MY HUSBAND AND I were flying over Texas in our Piper Cub bound for Oregon. We had listened on our radio receiver at Tyler, Tex., to learn if a predicted "front" had moved past the Dallas-Ft. Worth area, and, as we heard no further news on it, we assumed that it had gone through as forecast. We started out with only fair visibility, a sturdy southwest crosswind and lowering clouds. The weather improved, however, as we went along and beyond Dallas became CAVU, but the strong southwest wind held.

After a two-hour delay at Wichita Falls where we dallied over a lunch in town, and dickered with the airport manager who wanted to buy our Cub, we left the city in increasing wind, but otherwise clear sky. Approaching Amarillo, however, we could see great towering cumulus off to the northwest. When within a few minutes of Tradewinds field, a huge cumulus formed into a cumulo-nimbus and spread out over the surrounding territory. It built up fast. In less than 30 minutes it was a full-fledged thunderstorm. The air was getting pretty gusty and I edged toward the dark base of the massive cloud. After looking it over, I remarked that we had better turn and seek a friendlier portion of sky, but up ahead the field was already in view.

All around us clouds were piling up now, the wind had shifted to northwest and was getting violent, bouncing us like a rubber ball. It looked black ahead but wasn't raining yet, so I nosed the Cub under the outer rim of our murderous looking "friend." Luckily, we had held a 1,500-foot altitude for, just as we thought we had it made, the plane lifted a fraction in space, then slammed straight down, 500 feet. At the same time there was a loud crack and, as I yanked the throttle back, I thought to myself: "There goes a wing." However, my husband assured me it was just his head crashing through the inner fabric covering at the top of the plane.

I executed a 180, and flew back out into the open to the accompaniment of rain and hail. Our air map listed two ranch strips used for private flying, but we couldn't find them. We cruised back and forth, even contemplating heading toward our next stop, Tucumcari, but by now the whole advancing line of the front was beginning to surround us.

I decided to get down while the plane was still right side up, and headed for a wide country road, but abandoned my plan of landing on it as we shot past power lines and telephone poles. The wind had shifted again and the huge storm over Amarillo was headed toward us. I chose a large pasture near a ranch house, noted that the cattle were in the far end and bounced the Cub in. We taxied over to a corner by a garage, got out and held onto the struts as the storm came over. Though the owners were not home, their neighbor saw us land, came over, helped us tie the plane down and took us to his home where we sat out the storm.

That evening, after the fury of the storm had died down, we examined the plane and counted some 200 holes of various sizes in both fuselage and wings punctured by hail.

We patched our plane next morning with strips of adhesive tape and flew into Amarillo to have it checked. The inspector waved us on to Oregon, stating the tape would probably outlast the fabric.

MRS. MARIE HUBERT

Haines City, Fla.

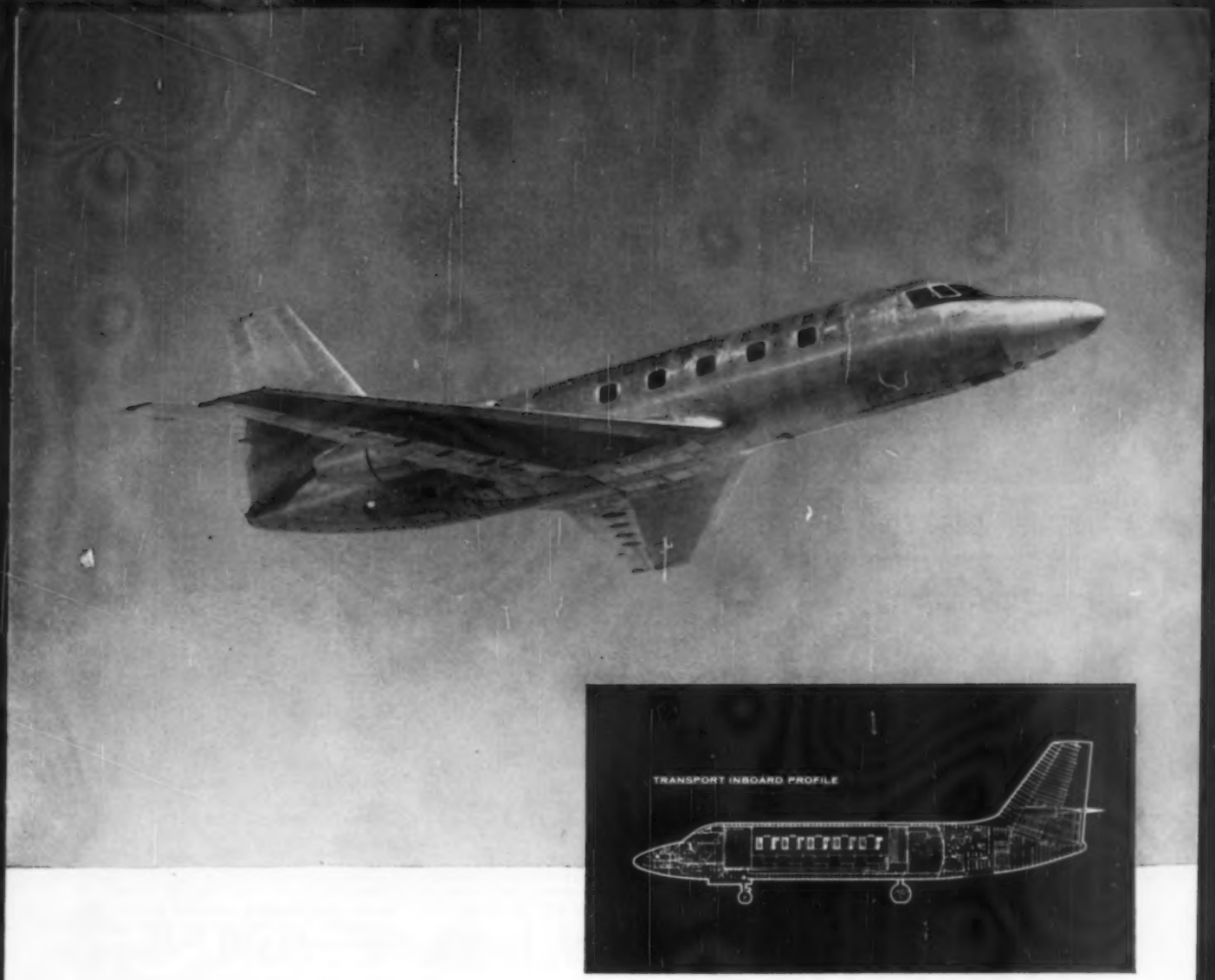
66 MINUTES TILL TOUCHDOWN

EARLY in the afternoon of Wednesday, March 27, 1957, the weather around Louisville, Ky., was not particularly bad. There was a solid overcast, estimated ceiling 3500 feet and temperature 42° F at 1518 hours Central Time.

For a little over an hour, a pilot in a Cessna 170 equipped with Omni and ADF had been trapped above the overcast, lost, fuel about to run out.

It was 1412 when I turned on a low frequency receiver to catch the weather broadcast from Louisville Radio. They were repeating calls to 71 Baker and it was a minute or so before I caught on. A

(Continued on page 16)



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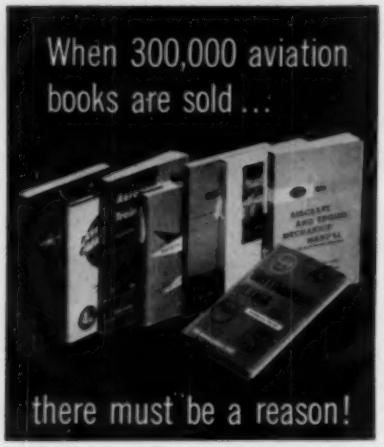
GEORGIA DIVISION, *Lockheed Aircraft Corporation, Marietta, Georgia*



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Hangar Flying

(Continued from page 14)

lost pilot was calling for assistance.

"71 Baker, this is Louisville Radio. Do you read? Over."

"71 Baker . . . 1, 2, 3, 4, 5, 5, 4, 3, 2, 1. Do you read? Over."

"Okay 71 Baker. Go ahead."

"71 Baker, tune your Omni to Lexington VOR and give us your radial to or from."

"Aircraft calling Louisville Radio, stay off this frequency."

"71 Baker, you say three three zero degrees to Lexington VOR. You're southeast of Lexington. Now try Louisville VOR and give us the radial for a cross-bearing. Be sure the needle is centered between the blue and the yellow. Call us as soon as you get it. We'll stand by."

"71 Baker, what other radio equipment do you have?"

"Roger. If you have an ADF you can home on the Standiford Outer Marker. Do you know how to operate the equipment? The localizer frequency is two one two. That is kilocycles."

"71 Baker, try Louisville VOR again. We'll stand by."

"Okay, what's your track to the station? Two seven zero degrees. You sure the needle is centered? What is your course? The magnetic compass heading?"

"Aircraft calling Louisville Radio, stay off this frequency."

"71 Baker, can you transmit on one twenty one five?"

"Okay, stay on one twenty two one."

"71 Baker, try a track again to Louisville VOR. You must have missed it."

"Roger. One eight zero degrees. You passed it. Hold your heading. Don't fly in circles. Watch the needle and when it fluctuates, swing back and forth, you are over it."

Later . . . 1500C.

"71 Baker, how much fuel do you have left?"

"About fifteen minutes. You'll make it okay."

"Turn to a heading of two nine zero degrees and hold it . . . now make a left turn to one eight zero degrees, these turns are for identification purposes. ATC clears you to turn to two nine zero degrees. Radar has you in contact. Turn to two eight zero degrees and maintain that heading. Your present position is about five miles east of Bowman Field."

"Turn back right. You are cleared to land on any runway at Bowman Field. You'll break out at about thirty-five hundred. Now maintain three two zero degrees to coast into Bowman. Keep your rate of descent at five hundred feet per minute. You'll make it okay."

"What is your altitude? Are you through the overcast? Turn left to two seven zero degrees. The wind is West North West at twelve miles per hour. Do you have the field in sight? You'll make it okay."

"We have you in sight now. Turn left, you overshot the field. Circle left."

"71 Baker, that's okay. Any runway."

"Okay, 71 Baker. We're glad to see you back on the ground again."

The time was exactly 1518C and the routine weather broadcast came on a minute later . . . Louisville/15: 19C/Estimated ceiling 3,500 ft./ sky overcast/ temperature 42°/dew point, 30/ wind west 9 mph/barometric pressure, 30.21.

With radar, there's really nothing to it but the sweat. Both in the air and on the ground. Whatever its price may be, the cost is never too high if a human life can be saved—as it was in this particular instance.

RAYMOND K. WILSON
Louisville, Kentucky

THAT GRAVEYARD TURN

ONE DAY a friend asked me to fly him over to a ranch in the neighboring county where he had a job to adjust a refrigerating unit.

We had just installed a cruising propeller on our Aeronca 7AC and as I was anxious to try it out, I readily agreed.

At the airport, we rolled out the ship, preflighted it and were off on our way. My friend, Frank, who knew the terrain well, was acting as navigator.

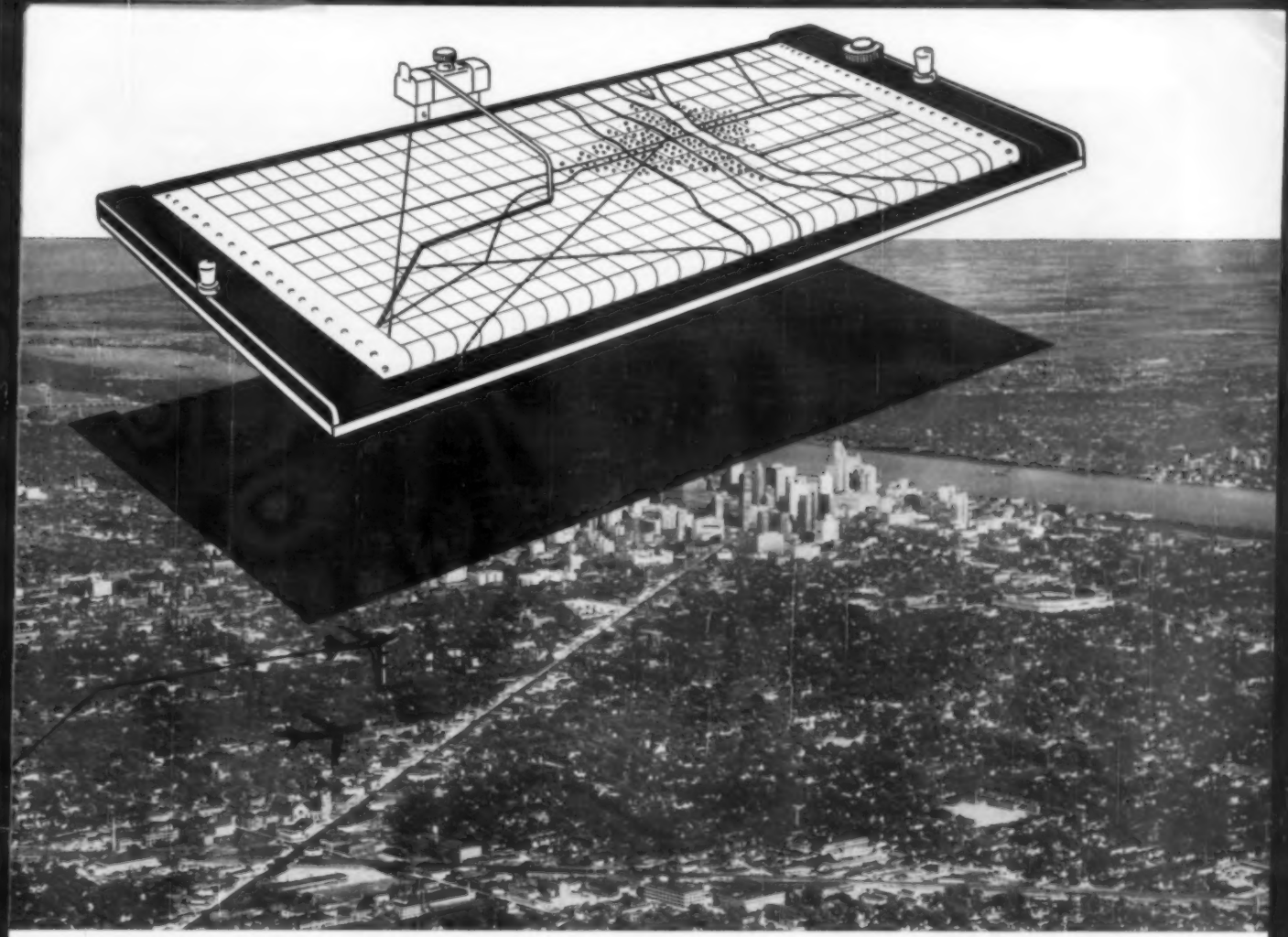
One-half hour later, we landed in a 54-acre pasture, right into the wind, and stopped after a run of 1,200 feet. Frank took care of his equipment and we were ready to go home in 30 minutes.

Taxiing out for take-off, I noticed that the wind was about 10 mph from the east. The east end of the field was bordered by 30-foot high power lines and mesquite of about the same height. The ground was sandy and soft. Reaching the extreme west end of the pasture, I swung into the wind, locked the brakes and revved up the engine to full rpm; then released the brakes for short field take-off. Much too slowly, the Aeronca gathered speed. The tail finally came up and the ship became lighter, wanting to fly.

Just as the gear sucked free of the sandy loam, I started to abort the take-off but decided that I could make it. By then it was too late. The cruising prop did not give me the climbing power that I was used to. I could not clear the wires and the mesquite did not look good to me. So I committed one of the cardinal sins in flying by starting a right turn on take-off to carry me parallel to the power lines. The maneuver brought me too close to the wires. I racked in more bank and she slid out on me. As we stalled, some of the training that had been hammered into me paid off. I stood on the left rudder pedal which brought the right wing up far enough to keep it from digging in at a right angle. As we hit, I cut the switch. The starboard wing dug in and threw the nose and landing gear into the ground. The ship rolled over, washing out the left wing, tip to boot.

Our injuries were confined to a small scratch on my forearm. Frank lost his glasses, which he recovered soon after. I attribute our getting out unscathed from a bad crash to the fact that the Aeronca was equipped with shoulder harnesses and wide lap belts which were used by both of us.

A. R. BERRY
San Francisco, Calif.



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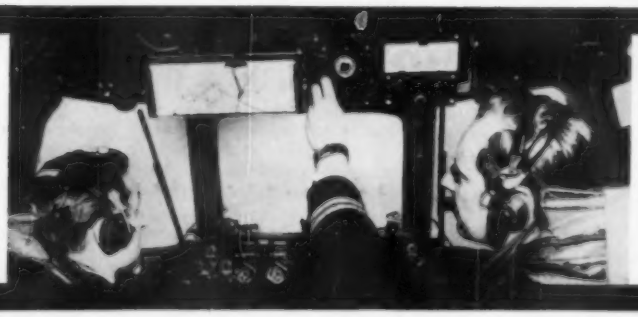

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THE SPACE ENCYCLOPAEDIA: A GUIDE TO ASTRONOMY AND SPACE RESEARCH (E. P. Dutton, $6.95).

Leading the van of recent serious books on the conquest of outer space is this authoritative, highly illustrated encyclopaedia by a group of British and American scientists. Words and terms are presented alphabetically and defined both in narrative and in illustration where feasible. They relate both directly and indirectly to missilry and rocketry, upper atmosphere research, astronomy, astronautics, man's knowledge of survival in space. Areas covered range from the far galaxies to the moon and planets where human conquest will soon reach. It is a complete, thorough and popular factual guide to all phases of space research and astronomy with a supplement explaining the launching and orbiting of Sputnik I and the USAF's "Operation Farside"—which fired a research rocket to 4,000 miles.

This "first of its kind" practical reference and study guide is recommended for writers, editors, students and laymen who seriously follow the rapid progress into space.

ROCKETS AND MISSILES, by Erik Bergaust (G. P. Putnam, $2).

A 48-page, oversize complete picture-narrative of all American rockets and missiles—Research, Army, Navy, Air Force and future types (now under wraps) with an introduction to the principles of missile propulsion and guidance, a brief missile history, specific data on each type, and its contribution to our overall defense effort.

ROCKET POWER AND SPACE FLIGHT, by G. Henry Stine (Henry Holt, $3.75).

A simplified illustrated explanation of the principles and fundamentals of rocketry, missiles, satellites and space travel.

SATELLITE, by Erik Bergaust and William Beller (Bantam Books, 35¢).

An informative, highly readable story of our missile and satellite research and development leading to the first step into outer space.

AIR FORCE AIRS, by T/Sgt William Wallrich (Duell, Sloan and Pearce, $2.95).

From the time men first mounted wings they began to sing about flight. Out of three wars and the interludes of peace has come a musical lore of the air, not unlike the songs of the men of the sea. Bill Wallrich spent 16 years collecting tunes, ballads, parodies that airmen have sung in the air, on the flight line, in the hangars and the barracks, at the bar, the world over; 175 of the best tunes make up pocket-sized *Air Force Airs*, the first aerial songbook to be commercially published. Organized chronologically, it presents the songs as they developed parallel with the history of flight. An introduction to each section places the songs of the period in perspective and each tune is prefaced by a brief statement tracing its origin. Reflected is the flyer's distinct way of life, his thoughts and feelings, his joys and tears. This is certainly one that should be around whenever airmen gather to share in the fellowship of their trade.

WINGS FOR LIFE, by Ruth Nichols (Lippincott, $3.95).

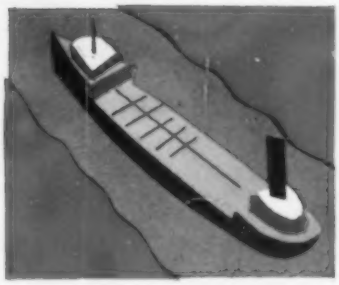
"Flying has nearly killed me many times; it has never made me rich. Yet," says Ruth Nichols in her autobiography, "I have reaped humanity's most treasured reward—life in its fullest meaning . . ."—a great tribute indeed to a great profession by one of America's true air pioneers.

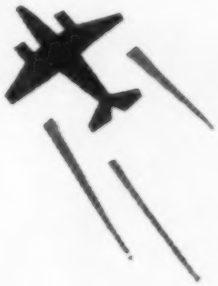
Ruth Nichols spent a lifetime in the air. It all began in 1919 with a "ten-dollar, ten minute" ride with Eddie Stinson in an open-cockpit OX-5 of WWI vintage. Ruth was just out of finishing school. Though the years ahead still meant Wellesley, the social whirl of New York and Miami, Ruth belonged to aviation the moment Stinson lifted the OX-5 off the grassy field.

Sneaking instruction whenever she could, Ruth, licensed in a "Seagull" in 1927 and was off to a career in the air marked by nearly three score close brushes with death, 35 aeronautical "firsts," and the distinction of America's outstanding woman flyer. Few fellow airmen actively lived the conquest of the air or played so complete a part in it.

Most of Ruth's story is in the 30's—years of trial and stretch in American aviation—years when vision and courage far surpassed the technological state of the art. Among the numerous dramatic episodes featured is the ill-fated trans-Atlantic venture in Powel Crosley's Lock-

(Continued on page 20)





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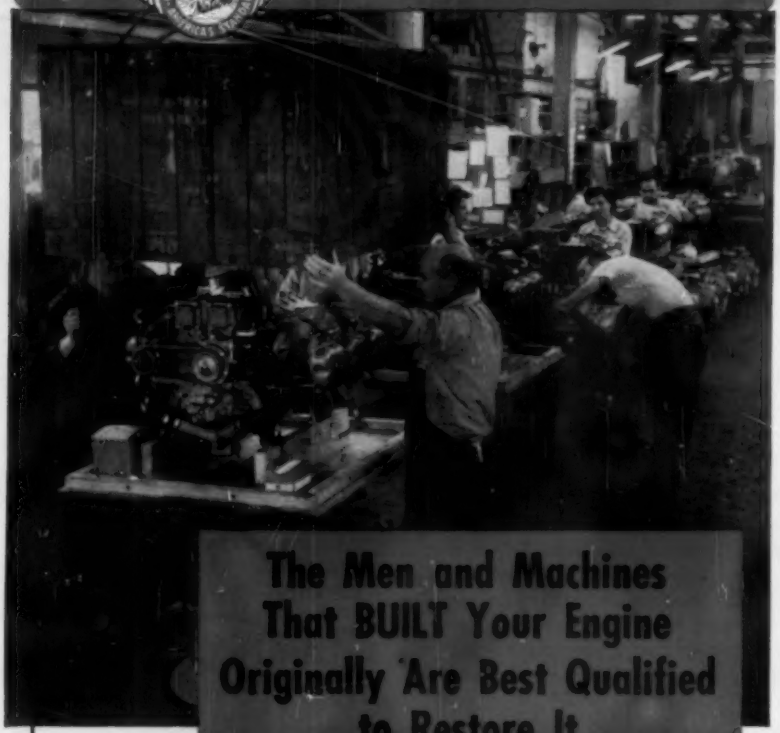

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MUSKEGON • MICHIGAN

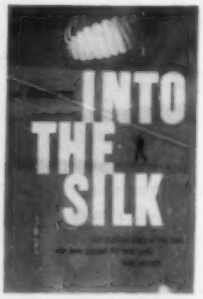
Have You Read?

(Continued from page 18)

heed Vega "Akita." This bold undertaking, on the heels of Lindbergh's success, ended on a rocky slope near St. Johns, New Brunswick. The North Atlantic again clutched at her life in the post WWII years. While returning from a U.N. overseas assignment, her airliner ditched at night, in the cold, rough sea off Shannon, Ireland.

Although today her time is largely devoted to civic and professional functions, Ruth still keeps her hand on the stick. Her recent accomplishments include soloing an Air Force jet T-33 and a trip beyond the sound barrier. These ventures add to the 140 types of aircraft she has flown in a full career on the air frontiers. And they prelude her hopes that "when space ships take off, I shall be flying them."

INTO THE SILK, by Ivan Mackersey (W. W. Norton, $3.95).



Over 80,000 airmen have saved their lives by parachuting since the first successful emergency bailout on 22 October 1922. "Caterpillar" No. 1 was an Army Air Service test pilot Lt. Harold Harris who crawled out of his disintegrating Loening at 2,500 feet over McCook Field in Dayton, Ohio. His chute opened at 50 feet. He landed safely in a grape arbor while dozens of stunned witnesses stood in disbelief. Four years later Pilot Officer Eric Pentland became the first RAF to hit the silk and fly again.

The parachute is a flyer's last chance. Each bail-out story is a real-life drama. *Into the Silk* collects the best of the tens of thousands of official reports, both British and American, to make a book that does not have to strain for built-in suspense. It runs the gamut from the "stick-and-wire" days to high speed jets, from extreme altitudes to 50 feet. And for incredibility it relates the experience of Flight Lieutenant Ted Ansfield, RAF, blown from his Lancaster in 1943 at 18,000 feet. He landed in 18 inches of snow—without using his parachute. And he lived. Airmen are bound to profit by the many techniques these stories bring out.

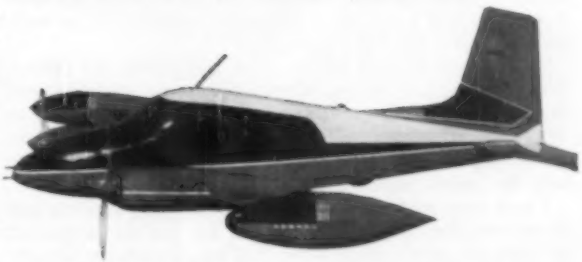
FLYING HIGH: ANECDOTES ABOUT THE AIRWAYS, by Franklin W. Marsh (Public Affairs Press, $2.50).

Every trade has its lighter side and so with aviation. Here Marsh collects several hundred humorous, true, cartoon illustrated stories told by pilots, stewardesses, and ground service personnel. The brief yarns involve crews and passengers, people and places on the airways.

CLIMBS 415 F.P.M. ON ONE ENGINE!

More power per pound of weight than any other business twin! That's what you gain with the new Cessna 310B—the kind of power that lets the 310B climb 415 feet per minute on one engine while fully loaded with 5 passengers, gives you a smoother 213-mile-per-hour ride.

But doesn't all that power make more noise? Not in the revolutionary "Comfort-Sealed" cabin of the new 310B! This completely new and roomier kind of cabin is *completely* insulated and sealed against sound from floor to ceiling. Its windows and windshield are *double-heavy* and *vibration-free*. A quiet, roomier cabin; fully retractable landing gear; safety-tip tanks; broad-span tail group; powerful Continental engines in flat engine nacelles . . . these are just a few of dozens of way-ahead features of the new, more comfortable, easier-to-handle 310B. Price: $59,950 f.a.f. Wichita. Call your Cessna dealer (see Yellow Pages of phone book) or write CESSNA AIRCRAFT COMPANY, DEPT. F-22, Wichita, Kan. Inquire about Cessna Lease Plans.



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FLYING has a target

GILL ROBB WILSON
Editor and Publisher

SIX YEARS AGO, I sat down at this desk as Editor & Publisher of FLYING, gathered a little handful of devoted ones who combined practical aviation and newspaper experience, and went to work. The magazine was deep in the red, was supported by no advertising, and had no editorial objective. The man who owned the property knew he was soon to die and said to me, "It's the one thing I can leave with the hope that it will repay this country something of the debt I owe for the opportunity it gave me."

Loyal friends said we were crazy. We knew nothing about the magazine business—and still don't know much. But as I saw it, that wasn't what we had to know. What we had to know was that a man has to do something besides making a living. He has to make a life—and so does a people. If he does that he can hold his head up—and so can a people.

Our target was unmistakable. The destiny of the United States lay aloft—at least that was our enduring conviction. But it couldn't be realized unless the base of public understanding of that fact was broadened. We had to get to the man on the street, to the mind that shapes public opinion, to the potential rider of the airlines, to the young fellow in college who has a career decision to make, to the businessman whose company could profitably use the lightplane, to the government official who shapes national defense policy, to the educator who motivates the oncoming generations. It wasn't enough to talk to the trade alone—to pitch for advertising. The trade would wither and lose ability to support national civil and military aviation stature if the people didn't grasp the significance of it. The whole of aviation had to be advanced and the whole of the people had to understand why it must be advanced or the country would inevitably lose its place among nations. It wasn't enough for the aviation industry to make a living for itself. It had to make a life as well, both for itself and the country.

This meant FLYING had to have something for everybody—something for the fellow back in the sticks as well as the airline pilot; something for the mechanic as well as the engineer; something to motivate as well as to inform; something to lift the national mind upstairs; something to help the people make a life as well as a living.

I was assured that I would starve to death seeking this objective—that I had to set up as the special proponent of some one phase of aviation and court its favor for advertisement if I hoped to keep FLYING alive. But the object wasn't to keep the magazine alive. The object was to make a way of life. In any case, I had been told the same thing back in the days when we organized aviation forums to get support for air budget—when we toiled to get a national airport program; a Civil Pilot Training Program; a Civil Air Patrol; a national legislative program for civil air transport; and, even before that, a recognition of aviation in the military services. And just lately hadn't the skeptics had a fine time telling me the idea of "Jet Age Forums" was eyewash when we inaugurated them in the Air Force Association? I am pretty case hardened to being told how "idealistic" and "impractical" I am. So FLYING has shot no deer in the editorial cow pasture and has no barrel of advertising fish into which to aim. Not that this isn't the way to eat easy but there seems more at stake in these days of Sputnik.

So now I sit here looking back down the six years of stewardship just a little proud of aviation's greatest reader audience; just a little proud of the quality of FLYING's readers; and just a mite proud of pulling out of the red—but inordinately proud of a devoted staff which has sweat to broaden the base of public insight into aviation as a way of making a life for a people as well as for an airman. And I'm proud of those who have seen what we were aiming at and held up our hands—writers, readers, advertisers, the military services and many government officials and business executives who have turned aside to be encouraging and understanding. And I'm proud that the editorial policy of FLYING for six years has been unaffected by any vestige of pressure from any source. We may not always be right but we sure are free to be.

Which reminds us of a bit of a story. John Ruskin, who wrote the Seven Lamps of Architecture, one of our favorite volumes of leisure reading, was chided about attending a little church where a young Dominie held forth. Ruskin of course was a famed agnostic. "John," his friend said, "What do you find in listening to that chap. You don't believe his doctrine."

"No," Ruskin replied, "But he does!"

There are many things I wish we could do for our readers—four-color layouts, for example. But I just can't afford 'em and stay in the black, and I think a medium of the public press has to be economically sound to remain intellectually free and honest. Too, I wish we could afford big checks for our writers instead of modest ones. But we can't. They, too, work for us because they think that, in addition to making a living, the making of a life is essential.

The next six years will be momentous. For us, we see only the prospect of hammering away at our objective and if dogged determination is the key to achieving it—well, we have what it takes. The thing that makes it worthwhile is our humble role in helping to make a way of life that in the air age will serve our confrere airmen and our country as they and it struggle to realize their greatest potential so that the land may be secure and free and the world find its way to peace. We believe every airman, great or small, has a contribution to make to this end, and that aviation itself is the area of the valley of decision. FLYING will continue to patrol its length and breadth.

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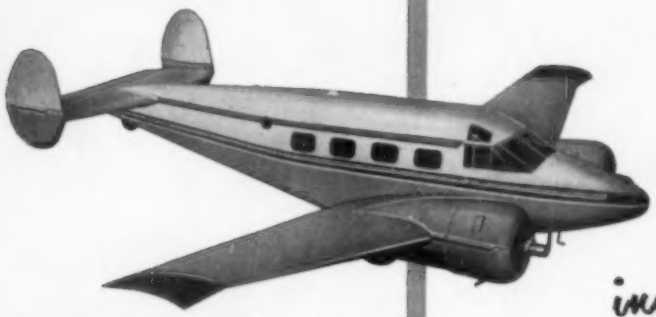

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RANGE....up to 1,060 miles nonstop
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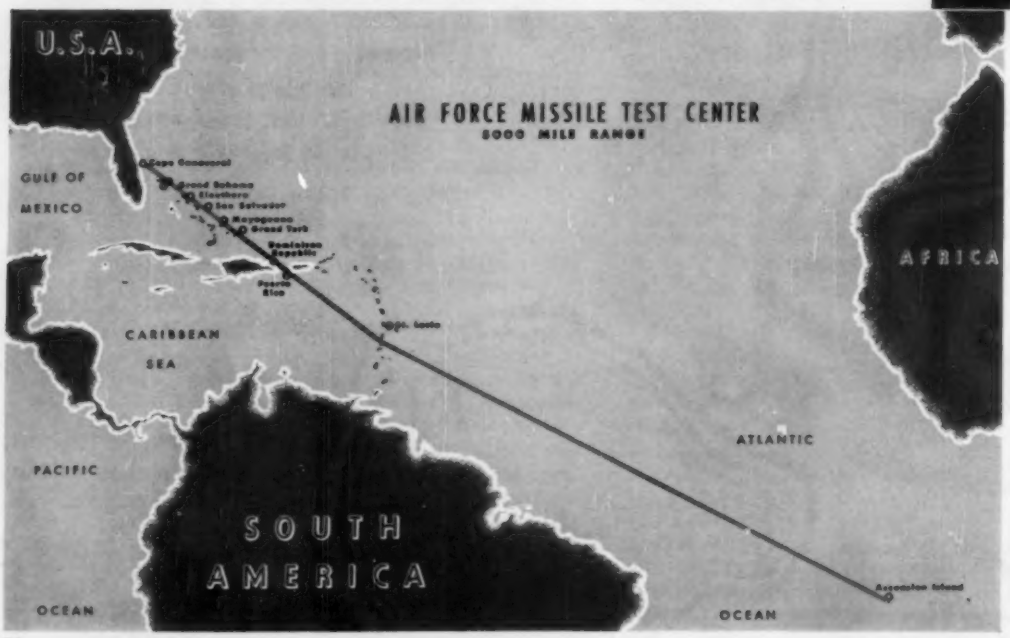
I was a dime-a-dozen landlubber until I surprised myself by embarking

FROM KANSAS TO COSMOS

By DONALD BROWNE
Major, USAF

Stretching beyond the Caribbean is the world's longest proving ground for guided missiles and rockets.



Left: Cushioned against stowed rubber rafts, the author uses a K-20 camera during the aerial phase of the Bahamas survey. Rear hatches of the SA-16 make excellent camera positions. Below: San Salvador Aux. AFB near where Columbus is reported to have landed.

Supplies for USAF Survey Team are off-loaded by Bahamians in small boats because coral endangers SA's hull.

WHERE THE COMPASS of experience may swing the career of a man who directs his mind to the toil of the air age, is an enigma indeed.

As I look in retrospect for less than a mere decade from this satellite-gazing year of 1958, I find a thrill in the fact that the chores of those days were so soon to become a part of the introduction of the cosmic age. Thus must have felt a seaman who helped cast off the lines of the Nina or Pinta or Santa Maria after it became known that Columbus had discovered the new world.

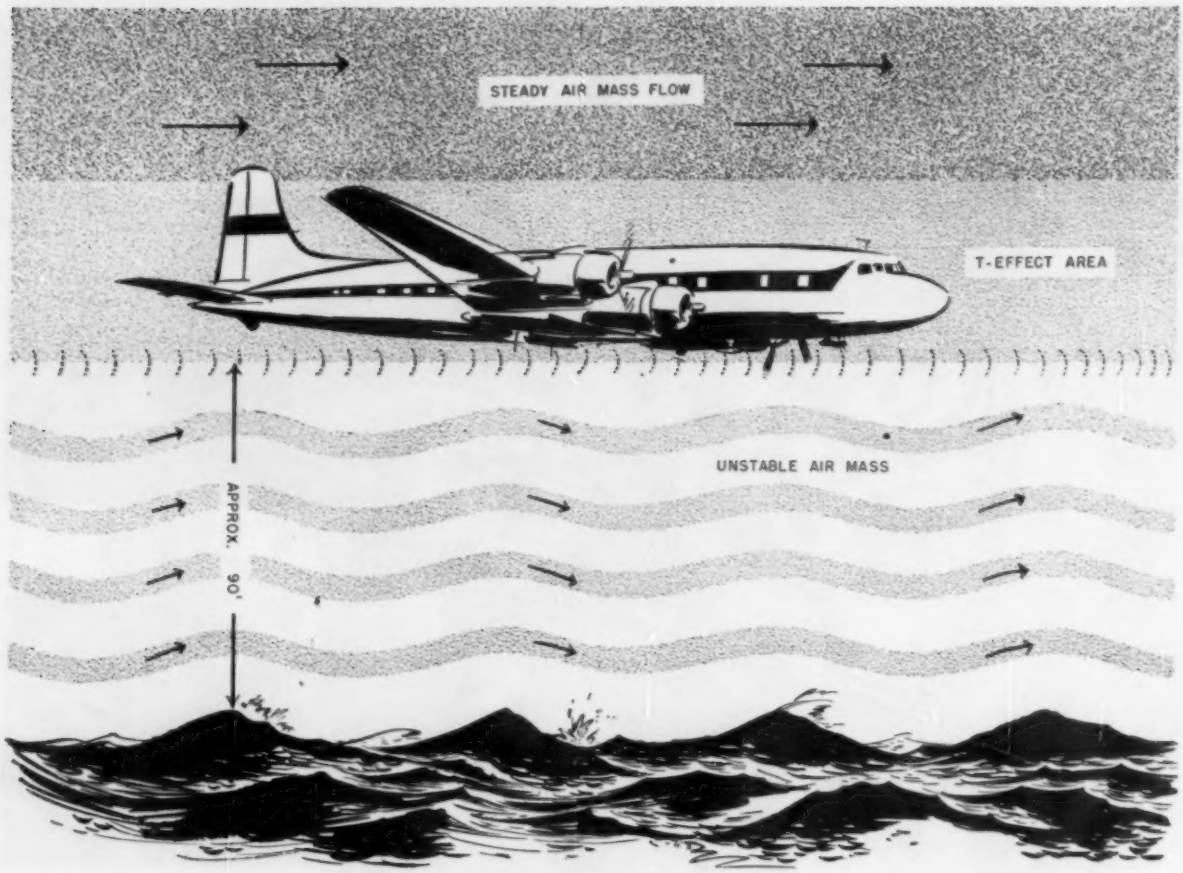
Navigating to the tune of a spicy Latin-American mambo on the radio compass, my co-pilot, Capt. Bill Morin, set a course toward Camaguey, Cuba. Sgts. Al Mills and Charles Martin, our engineers; and Sgt. Jim King, radio operator, were at the chores of getting the big amphibian shipshape.

Nassau, Bahamas, disappeared behind us in the brilliant noonday and I began to marvel at my job. We were preparing the way for the invasion of space. Landlubbers are a dime a dozen in Kansas and it's surprising how many of us go to sea. But not many go the way I have, as a pilot of a USAF amphibian or for the purpose of logistics to enter the sea of the universe.

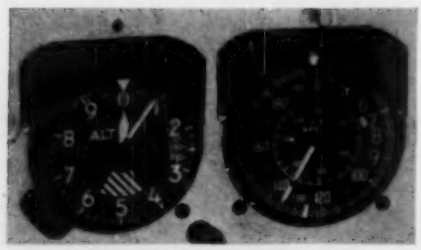
When I left Wichita a few years ago and joined the Air Force, it wasn't in even my wildest dream to be any kind of sailor. Yet that's what I have to be. Besides knowing all the traffic rules and possessing some degree of flying skill, it is required that such pilots also know seamanship, oceanography, and have a healthy respect for the open ocean.

After learning these things at the Air Force amphibious pilot training school at Tampa, now at Palm Beach Air Force Base, I found myself driving a Grumman SA-16 over the blue-green Caribbean. Our amphib united the Bahamas, composed of some 3,000 islands, cays and rocks scattered over 10,000 miles of ocean, with the USAF Missile Test Center at Patrick Air Force Base, Fla.

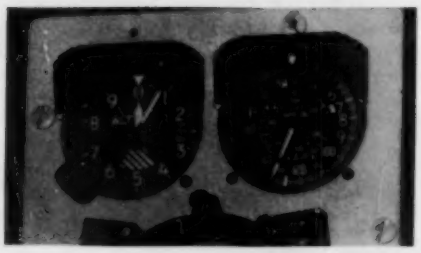
Stretching over the South Atlantic beyond the Caribbean is the world's longest proving ground for guided missiles and rockets, of which the orbiting ones are called satellites. The range begins at Cape Canaveral near Patrick Air Force Base on the Florida coast, and extends beyond Grand Bahama and Eleuthera Island, past the Dominican Republic, to a point off the coast of Puerto Rico, then on down past Trinidad and into the South Atlantic. If necessary, it could be extended entirely around the world without ever crossing a major populated land area. Here, long-range (*Continued on page* 73)



The elusive "air cushion" which lies in a narrow band above the sea can "make" extra fuel.



100 feet.



80 feet.

Chart I.

T-EFFECT

A NEW PHENOMENON

By JOSEPH P. TRACY, MAJOR, USAF

Editor, Pacific Air Forces "Flyer"

THE PHENOMENON to be discussed only recently was recognized sufficiently to verify earlier suspicions. The writer arbitrarily calls it "T-Effect" in recognition of the research airmanship of Maj. Samuel W. Tyson, USAF. He was the first pilot to deliberately seek and identify this elusive "air cushion" that exists only in a narrow band of altitude above the surface of the seas.

Some will mistakenly continue to call this magic area "ground effect". But the factors that govern ground effect are not the same factors found in this new phenomenon. Ground effect has long been recognized, if little understood. The past year has seen publication of several articles dealing with the subject but, although quite factual, they got scant attention in aviation circles.

Probably a number of reasons accounted for this lack of interest. Primarily, the average pilot would not concern himself with anything so nebulous. He recognized that an aircraft floats near the ground because of the "air cushion" and that was about the extent of his interest. Based only on early experience, the writer is somewhat suspicious that the 1930 crop of designers knew little of ground effect either. We had an OX-5 International that had an absolute ceiling of 50 feet and one home-made Heath Parasol that wouldn't do even that well. But, ground effect kept 'em aloft, even though somewhat on the low side of the altimeter scale.

T-Effect does have one point of similarity to ground effect. Both are located in proximity to the surface. But where the latter becomes progressively more effective as the aircraft descends to any surface, T-Effect, on the other hand, is found at an altitude of approximately 100 feet and only over open sea areas.

Before discussing the phenomenon and how it may be utilized, let us recall Tyson's dramatic use of it. Most readers are familiar with the epoch-making flight of the Major and his struggle to keep a crippled C-97 airborne for six hours over the Pacific. Had it not been for T-Effect, he couldn't possibly have made the grade. The C-97 was cleared from Travis Air Force Base, Calif., to the Honolulu International Airport. Altitude was to be 8,000 feet to the Equal Time Point and then 16,000 feet on in to Oahu. Total time was computed as nine hours and five minutes.

Departure was normal, after two mechanical delays, everything went according to schedule until about half way across. At this point, clearance was obtained to climb and Tyson directed the second pilot to take over and make the actual ascent. Upon reaching 16,000 feet, everything happened at once. The pilot called for Cruise Power and, as the engineer reached for the throttles, the No. 1 propeller ran away. It wasn't a normal runaway by any means. The rpm went up and up—3,000—3,500—3,800. The prop screamed and woke the sleeping military passengers with a start. The propeller oil quantity warning light had come on just as the runaway started and all attempts to replenish the oil supply were ineffective.

Major Tyson took the controls and hauled the C-97 up. He called for 55 per cent flaps and, as the pilot attempted to feather the No. 1 engine unsuccessfully, Tyson got the aircraft slowed to 150 mph. Gradually the rpm dropped to 2,100 and, by experimenting, he found he could keep the props synchronized if the air speed remained at 155 mph. However, the drag from the free-wheeling propeller, even with negative manifold pressure, was tremendous. It required everything the pilot could put into right rudder plus full trim, to hold the machine straight.

Tyson held a consultation with his two engineers and they agreed that the soundest procedure would be to freeze the engine. Accordingly, the oil supply to the engine was shut off and they waited for the wind-milling prop to stop turning. While all this was going on, a May-

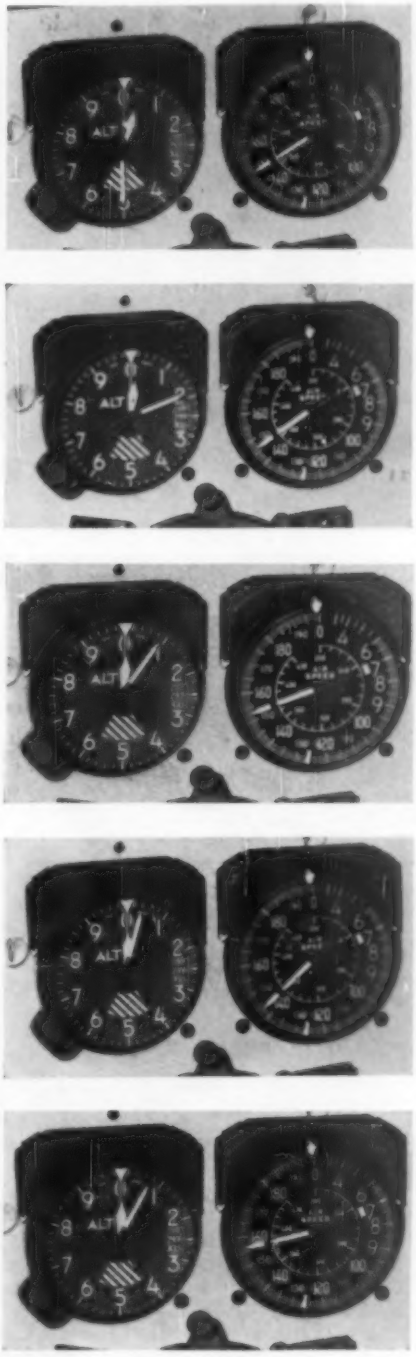
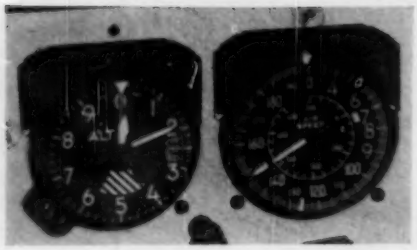


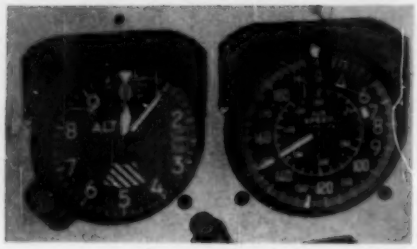
Chart 2.

day message (SOS) was sent and the navigator talked with the Coast Guard Ocean Station Vessel *November*. The aircraft was right over *November* as evidenced by a clean bird-dog swing at this time. So far so good. At least they were within reach of help and that was comforting.

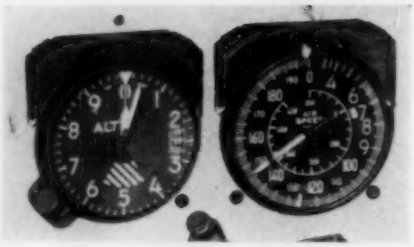
Just as they were passing through 11,000 feet, a sudden violent yaw was experienced as the left outboard engine froze, but the propeller continued to turn! This presented a new problem. Tyson knew that sooner or later the fan



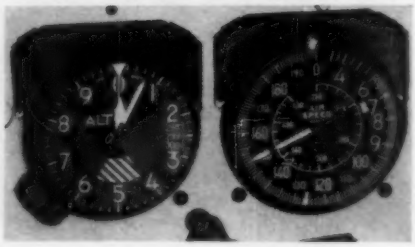
200 feet.



100 feet.



50 feet.



75/90 feet.
T-Effect area.

Chart 3.

would twist itself off into space. He knew too that, in all probability, the broken prop shaft and parts of the propeller would get mighty hot before they let go. Below was an undercast with tops at about 6,500 feet. Just before they got down to it, the crew made every effort to get things firmly under control. Each crew member aboard knew the free-wheeling prop was getting hot and would soon part company from the engine. The second engineer was stationed at the left window to watch the propeller dome and instructed to report when it started to change color or throw sparks. Fortunately, it was nearing dawn and that helped a lot mentally. The aircraft was continuing the slow descent when the engineer reported sparks from the prop dome and shortly thereafter told Tyson that No. 1 engine was on fire. This wasn't particularly cheerful news.

There was but one thing to do now. The aircraft was heeled over in a 40-degree bank to the right to keep the windmilling prop as high as possible and the left inboard engine was shut down and its prop feathered. None too soon! The plane had turned only about 30 degrees when the No. 1 prop cut loose, slammed into the fuselage and, fortunately, sailed off into space. As the propeller departed, the engineer reported a full-fledged magnesium fire going in the nose of the outboard engine. Some days you just can't win.

We'll take the liberty of quoting Major Tyson's report. "I was using METO power on both right engines at this point and decided it was about time to bring in No. 2 again and get some additional help. Upon my order, the copilot pulled out the feathering button and immediately a terrific vibration started. I told him to feather again because I realized that the No. 1 prop had struck No. 2. We were now committed to operate with two engines regardless of whether we went on to Oahu or turned back."

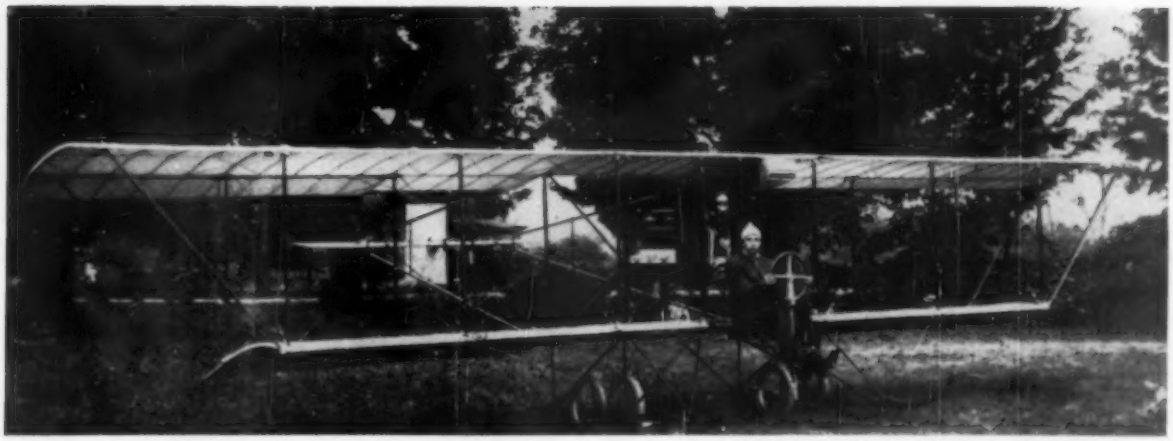
So there they were, still descending, hoping the fire would burn out, dodging clouds and wondering what was going to happen next. Much to the relief of all concerned, the engine fire burned itself out. It had given much more concern than the thought of ditching, so with that problem whipped, spirits rose considerably. From then on it was a case of "let's fight this dog in and land on terra firma!"

Upon reaching 2,500 feet, the engineers and navigators got together and computed the fuel problem. According to their slip-sticks, the aircraft could continue to Hilo, Hawaii, and arrive with exactly zero pounds of fuel. That would be cutting it a trifle thin. However, Tyson figured they could grind on for another hour and then, if it became positive that they couldn't reach Hilo, he still had enough gas to get back to *November*. So he played it that way.

There was still one problem to be overcome—weight. The plane was flying, but the power needed to keep the machine in the air was excessive. It was decided to jettison baggage and mail. Major Tyson had found it necessary to employ flaps to keep the plane from vibrating. Actually, they were down about ten per cent. With this in mind, he decided that the left rear hatch of the passenger cabin would be the best opening to use for dumping cargo. There would be less slipstream on that side to force the bags into the controls. Even so, as the first sack of mail went overboard, it slammed against the horizontal stabilizer. Tyson dumped down an additional five per cent flaps. This raised the tail somewhat and the crew got rid of most of the mail before altitude became absolutely critical; critical altitude in this case being 50 feet above the waves.

The Aircraft Commander now called for METO power, ordered the hatch closed and clawed the machine back up to 1,000 feet. Here, they decided to go through the whole process again, consigning baggage to the drink. Manifold pressure was again reduced to keep number 3 and 4 engines from overheating completely and a slow descent at 155 mph was started. The crew, with the assistance of the passengers, untied the baggage down in the hellhole, passed it topside, then made like a bucket-brigade until the suitcases and boxes went sailing off into space. By the time this job was done, the airplane had once more sagged down to 50 feet and Tyson ordered the hatch closed. The opening was creating a lot of drag and contributing to the turbulence. The pilot couldn't hold altitude with the hatch open.

After everything was buttoned up, Major Sam got his crew together for a bit of figuring. To quote him again: "We decided to get things stabilized as much as possible and take a fuel consumption reading so that a final decision could be reached before it was too late to turn back. We now had the weight figured out pretty well; we were able to get a little air between us and the ocean; we knew our indicated airspeed and had (*Continued on page 52*)



The barn yielded a modified Thomas "Headless" Biplane in storage at least 40 years. Its owner was Earl V. Fritts, then of Oneonta, N. Y.

BARNS INTRIGUE ME

What better place to seek a "barnstormer" than in a barn?

By OWEN S. BILLMAN

I ONCE SAW a gas tank shaped like a stove-pipe pointed at both ends like the one in this picture," said the mechanic. "It was in a barn not over two miles from here."

These two sentences were enough to send my blood pressure rocketing. I had stopped in a small upstate New York village for repairs to my car, and the usual friendly conversation revealed that this mechanic had been a barnstorming pilot in the Twenties. I brought out my aviation scrapbook which I often carry on travels and he was looking at a picture of a 1911 Curtiss Pusher when he made the foregoing remark.

I could hardly control my eagerness as I threw questions at him fast and furiously. My ambition was to locate an old airplane which would be worth restoring and I had experienced many a disappointment in chasing a lead to a dead end. If I could find the owner of this gas tank! If it was really a gas tank! If it was off an old airplane! Maybe this was the lead for which I had been hoping!

My willing informant told me he had seen the gas tank quite by chance about 15 years before in a neighboring barn. He had at that time remarked about its odd shape and had been told that it was off an airplane that even at the time was described as "quite old."

On learning that 15 years had elapsed since his discovery, my blood pressure fell with my countenance. Nevertheless, I accepted painstaking instructions on how to reach the farm and, when the necessary work on my car was finished, started on my quest with some misgivings.

There was no answer to my first knock on the weathered farmhouse door, so I rapped harder and harder and was finally rewarded by the appearance of a farmer apparently in his seventies. He identified himself as Claude Taylor and volunteered that he had been having a cat-nap, since there wasn't much work to be done at mid-day by a farmer without a family.

Hopefully, I asked him my question.

His reply was, "Gas tank? Why yes, there was one here once and I suppose it's still out in the barn. We don't often throw away anything that might be of some use. Would you want to see it?"

With my eager assent we headed for the barn, one of the neatest, although thoroughly filled, ones I have ever seen. We searched high and low but could find no gas tank. I dejectedly climbed back in my car and prepared to leave.

"You know, that tank wasn't much good for anything anyway," said Mr. Taylor. "It didn't hold much gas because it was out of a real old-time airplane." I admitted that I knew this and that my interest was even more in old airplanes than old gas tanks.

"Well, why didn't you say so?" he ejaculated. "Most of the airplane from which that tank came is up in the loft. Would you like to see that?"

Practically speechless, I nodded and followed his slow steps up the narrow stairway. A dozen thoughts raced through my mind: Was it really an airplane? Was it really old? What kind (*Continued on page* 75)

At the wheel of his hot-rod 1910 Buick 16, drag-racer Fritts takes his flying buddies for a ride. Recognize any of them?

MIDGET

THE LITTLE RACERS are active again, and I am certainly glad they are because one of them recently provided me with one of the most exciting experiences of my "flying" life. It was the day after the 1957 Labor Day midget air races at Baer Field, Fort Wayne, Ind. I sat in No. 8 racer on the ground for about 30 minutes, checking everything in the cockpit, maintaining a barrage of questions about its flying characteristics to Lane Hartwell, owner of No. 8, who was so generously letting me fly it. Soon I was airborne on my first flight in a midget racer and quickly learned how little I knew about the characteristics of these planes.

Midget racing as it is today was conceived in 1946 in California by Art Chester, who was then president of the Professional Race Pilots Association. After the war race planes tended to get larger, faster and more powerful, most of them being converted F-51's, P-38's and the like. Much of the race could not be seen by spectators because of the necessarily larger course. They could enjoy no display of airmanship except at the start and finish; and an occasional flash of motion as a plane went around.

The midget races achieved instant crowd appeal because spectators could see the entire two and one-half mile, six-pylon rectangular course within the perimeter of an airport. Every exciting minute can be shared by the spectator —the "race horse" start with six or eight midgets lined up side by side on the runway, their engines revving wide open—the drop of the starter's flag—the take-off—the tight turns around the pylons—the fight for the lead—the wave of the checkered flag for the winner.

Midget race planes are designed and built by their owners—pilots under a strict set of rules and limitations which cannot be infringed, i.e., maximum is 85 hp (190 cubic inch class); fixed gear; fixed pitch prop or pitch changeable only on the ground; wing area of a minimum of 66 square feet (wing span averages about 14 feet); gas tank capacity of 15 gallons; pilot in an upright position rather than prone or otherwise. All planes must be equipped with recording accelerometers and must be tested to take six "Gs." All of them actually are built strong enough to test far beyond six Gs.

These rigid rules make the development of speed to rest with the ingenuity of the designer and the fine touch of the pilot. Aerodynamically, the midgets are among the most streamlined of all planes. With only 85 hp, most of the tiny craft can yet exceed 240 mph "flatout" on a straight course. Empty weight of each midget is about 500 pounds. Every year, the pilots clean up their entries, re-designing cowlings, attaching new or improved wings; lessening drag by changing canopies or wheel pants.

The first midget races were held at Cleveland in 1947 when the final was won by Bill Brennand at a speed of 165.87 mph. Ten years later, the most recent race at Fort Wayne was won by Bill Falck at a speed of 196.65 mph. This gain in speed has been achieved by the skill these race pilots have shown in streamlining their planes. The midget ("Buster") in which Brennand won that inaugural race in Cleveland, was designed by Steve Wittman and is now on display at the Smithsonian Institution.

Midget races were first sponsored by the Goodyear Tire and Rubber Company and later by Continental Motors. With the demise of the National Air Show, the midgets lost their setting and sponsors to furnish the purse. Without adequate purses, the pilots cannot afford to bring their planes from all parts of the country to participate, however much they love the sport.

With arrival of jets, nothing could compete with the military for spectacular speed. The Air Force slowly

Bill Falck gasses his midget racer, "Rivets," under the watchful eye of Mike Murphy, official race starter at Baer Field, Fort Wayne, Ind.

Randy Snoke touches down in No. 8, owned by Lane Hartwell.

Mike Murphy (right) congratulates final race winner, Jim Kelly.

Owner-pilot Jim Miller supervises gassing of his "Little Gem."

Tom Cassutt in his midget racer "III" about to yell, "Contact!"

FEVER . . . *I found it highly contagious!*

By ANTHONY LINCK

took over the airshow, turning it chiefly into a static display. The color and excitement of contest was gone and presently the National Air Races were no more although there is a movement to get them going again by 1959. One plan is to hold the races at the Cleveland Lakefront Airport, with the course laid out over the water. This would afford maximum safety and give spectators an unobstructed view of the entire event. It is hoped the midget racers can again benefit by substantial sponsorship, making it possible for West Coast pilots to bring their planes east for the events and vice versa. There presently are plans for at least three meets to be held in 1958; first at Columbus, Ohio, in June; at Fulton, N. Y., during the summer, and at Fort Wayne, Ind., over Labor Day. The course at Fort Wayne as laid out for the races last year was entirely within the view of spectators and, as a result, the races were enthusiastically received by the public.

Midget races have been instrumental in emphasizing many considerations beneficial to both airplanes and pilots. In addition to very clean designs with low wing loading (about 12 pounds), good flight characteristics are necessary for racing on a two-mile closed course. The racing pilots have tested the dependability of lightplane engines by operating them at abnormal temperatures and high rpms. Equipped with little racing props, these engines are flown an entire race at wide open throttle and usually are running at 3,600 to 3,800 rpms. Improvements engineered and tested in the races find their way into production airplanes as, for instance, the spring steel, low-drag landing gear that Cessna has made famous. It was developed and tested on his racer by Steve Wittman of Oshkosh, Wis., race expert since 1926 and still winning events every year.

Who are these racing pilots? Some of them are airline drivers from Capital, TWA or Pan Am. Some are airport operators who build and fly the midgets for recreation. One is a jet jockey. Some are "executive" aircraft pilots. Some are engineers for aviation companies which have developed unusual designs and are trying them out. The midgets have also contributed to youthful interest in aviation, not in participation, but by watching the race pilots build, test and fly these planes at local airports.

I have said that I quickly found out how little I knew about the flying of one of the midgets. As I became airborne, I had that same lonely feeling I had 12 years ago when I contrived my solo flight. But there the similarity stopped. Instead of put-putting along at 50 mph, I discovered that I was doing well over 130 mph and climbing at 3,000 fpm. For awhile I thought I had a tiger by the tail and not only couldn't let go but didn't dare. At first, no matter how tenderly I tried to control the midget, I was still over-controlling. I flew around for some time before familiarizing myself with stalls, steep turns and chandelles. I have been flying a Swift for years but it is a "docile doll" by comparison. Finally, I let No. 8 out, straight and level—man, this is a going bird—well past 200 mph in no time at all. After I had put in enough time to feel I was in the driver's seat, I brought the midget around into the pattern—put the wheels onto the cement and rolled out in a smooth landing.

Now I would like to fly a racer expertly, even do some racing. I've got the fever! Lucky me! END

The Sedona, Ariz., table-top airport is visible beneath an overcast in the right foreground.

THERE ARE A NUMBER OF good reasons for sitting down at Oak Creek airport near Sedona, Ariz.—one of which is that it is located in some of the most picturesque country in America. The field lies atop the mesa on the airway between Winslow and Prescott, and if weather happens to be closing in or your tanks getting dusty, you'll bless the folks who built the field.

It's a fair spit from there to any other good landing spot and, when those Arizona thunderheads build up, you sure can have a lot of fun watching them from the 4,400-foot clay strip atop the mountain one and a half miles south of tiny Sedona. That the elevation of the new airport is 4,300 feet above sea level won't bother you a bit.

Eventually, Oak Creek will be quite an airport. The present red clay runway will be extended to 5,200 feet by 250 feet wide and will be hard-surfaced. There will be a terminal building, hangars, field lighting and a taxi strip. Almost every one flying the route will mark the red rocks of Oak Creek Canyon and the wild beauty around Sedona. And rare will be the pilot who can resist pausing on the high mesa to refresh his soul—and quell his thirst and appetite.

Fishermen and hunters are bound to be among the first to make the place popular. Last year, several deer hunters got their bucks right smack on the runway and the nearby Page Springs Fish Hatchery keeps Oak Creek stocked with trout. Fishing is available all year long but a special five-day license for five dollars will suffice for the out-of-state tourist.

Currently there are only four aircraft based on the strip: two Cessna 180's of the Oak Creek Flying Service, a Navion and a Bonanza; but, at a recent breakfast fly-in, more than 100 planes participated in the fun. The flying service operates charter trips to isolated Indian villages in the area and nobody has yet asked for his money back after one of these intensely interesting visits.

Until the airport is completed, Joe Mosier, who is the moving spirit of the airport project and who operates a Shell service station in the village, suggests that you circle the town several times if you want him to bring you gas. He has everything up to and (*Continued on page* 80)

Just five miles south of Sedona lies Page Springs fish hatchery which stocks trout in the waters of Oak Creek canyon for the year-round fishing season.

George Jackson of Monrovia, Calif., inspects wheels and wings of his Cessna 140, as well as his own shoes upon landing in mud of Sedona after snowstorm.

A routine photographic assignment developed into difficulties atop an Arizona mesa where an airport provides a haven in the clouds.

Sedona and me

Photos and text by **DON DOWNIE**

The Shell station (right) in downtown Sedona, where Joe Mosier, who owns the Oak Creek Flying Service, keeps a rental car for transient pilots. Note the heavy overcast above the red cliffs north of town.

Framed by Pine Mountain, the Motel overlooks Mountain Creek Lake with golf course, clubhouse and crescent-shaped boathouse along shoreline.

Southern Sanctuary

At spring-fed Robin Lake with its white sand beach, thousands enjoy swimming, water skiing and boating in season. Callaway airport (left) is west of the lake.

By NOVETAH H. DAVENPORT

ONE OF THE REAL BEAUTY and recreation spots of the South is the Ida Cason Callaway Gardens, often referred to as "Georgia's Garden of Eden." Located at Chipley, 27 miles north of Columbus, Ga., a 3,100-foot, CAA-approved grass landing strip with hangar, tie-down, fueling services, and new 50-unit Quality Court motel are but two of the many facilities the Gardens has to offer.

A 2,500-acre sanctuary, in the southernmost foothills of the Appalachians for the preservation of native plants and wildflowers, the Gardens is laid out in miles of flowering trails. But more than beauty, these acres hold unsurpassed recreational facilities which include a golf course, well stocked lake for fishing, a water sports center on another lake, clubhouse (*Continued on page* 83)

A production expert from Detroit first put wings on the tiger, to become the

FLYING TIGERS' GRANDPOP

By PAT FORD

INTERCEPTORS ROARING off Formosa's runways for patrol of the mainland coast might well do a wing-over to their ancestors—Nationalist China's first air force dreamed into existence in 1911. The two have much in common. Chiang Kai-shek's planes of today and their ancestors were of American manufacture; and instructors of Chinese pilots for both were Americans.

The granddad of Chinese aviation, who first put wings on the tiger, lives now on a quiet sidestreet in Boynton Beach, Fla. Angular, greying, slow-spoken Ray Wilcox, 75, in 1911 was a production expert with a Detroit motor company where the automotive industry was starting to flex its young muscles.

Wilcox chuckles, recalling those days. "When word started to get around that the Wright brothers had flown at Kitty Hawk on Dec. 17, 1903, every backyard mechanic went crazy, particularly in the motor-age conscious Detroit area. They began sticking flying machines together out of anything and everything."

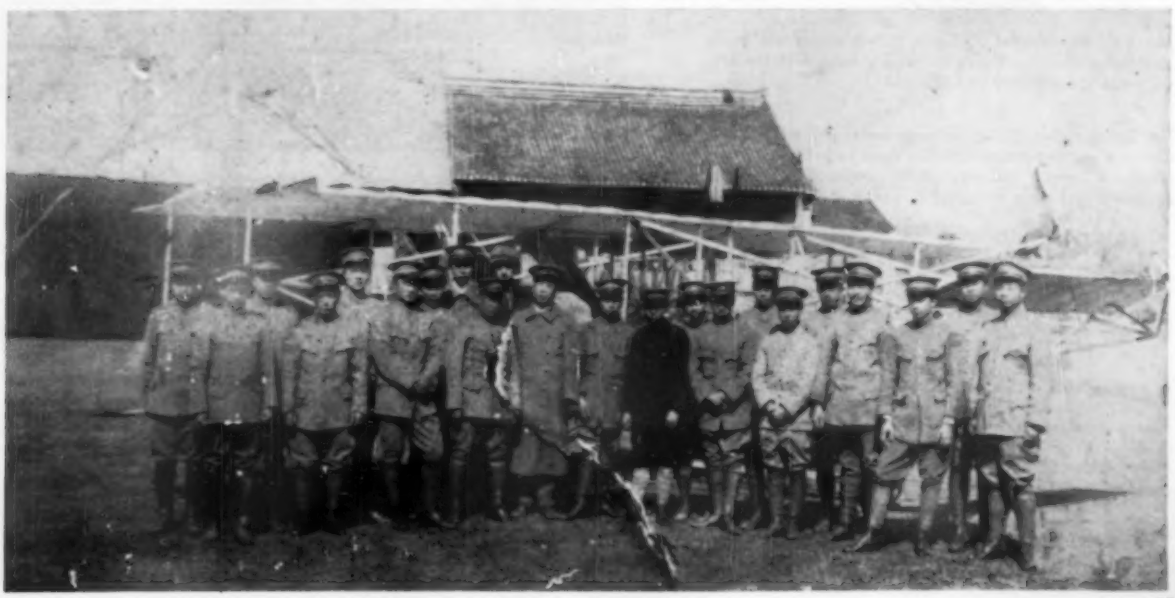
It took Wilcox himself two years of weekend work at his father's farm before he finally got a power plane into the air; this, some three years after the Wrights had secured their first patents in May 1906. Then Wilcox, along with many others, started figuring ways and means to make the new contraption pay off financially. Work days he spent in Detroit where with some better known and many long forgotten, he labored to put the nation on wheels.

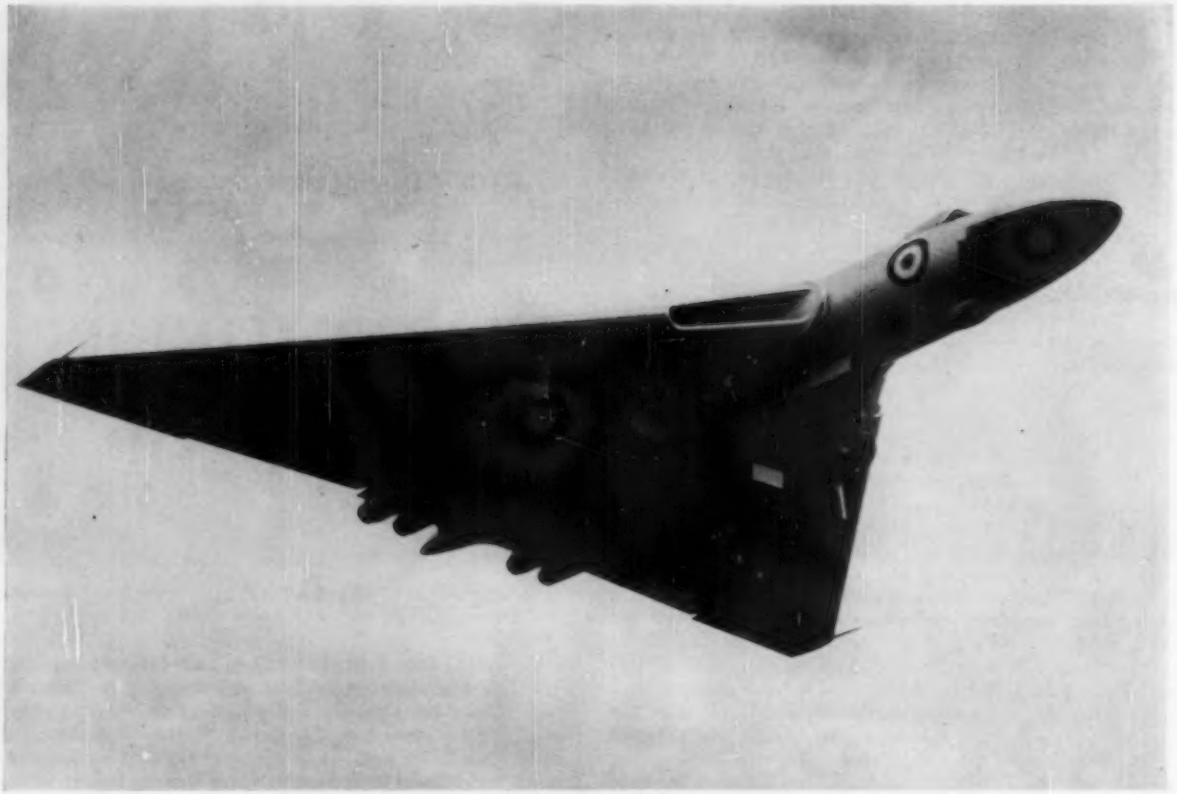
After lengthy pondering on how to capitalize on his erstwhile hobby, Wilcox established a "cow pasture" flying school, and advertised in the multitude of overnight flying journals which sprang up to herald the Air Age (via advertising). Dr. Sun Yat-sen, later to become first president of the new Chinese Republic, but then an exile in the U. S., spotted the ads and cogitated on possible military uses for the new machine. Exhibiting some of the foresight which later made him "China's George Washington," he discussed such possibilities with an associate, Jue Chockman. After the pair spotted Wilcox flying school advertised in the air journals, Chockman departed forthwith for the Motor City. There, Wilcox and Chockman needed only a single week to complete negotiations.

Terms included dismantling and shipping to China of two Wilcox-built planes, and purchase and similar shipping of four other box-kite types. Wilcox also arranged to buy six 75 hp engines to power the planes for combat, and an additional 50 hp spare engine for training purposes. As a romantic touch, Wilcox's tiny, perky wife was to accompany her husband on the trip. This was a kind of belated honeymoon.

Then, as now, the United States had laws to prevent its citizens from actively supporting the overthrow of any foreign government recognized in Washington. The Wilcox operation took on a slightly (*Continued on page 70*)

China's first pilots were these 21 students of Ray Wilcox in 1912. One of history's first mass-student instructors, Wilcox is in back row, center.





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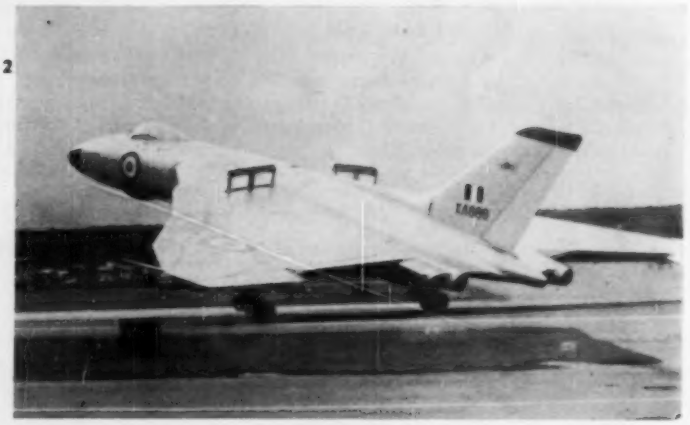

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1

World's first delta-wing jet bomber is the Avro Vulcan. Though slower than our coming B-58, this four-jet strategic aircraft is acclaimed as highly maneuverable and an exceptional high-altitude performer.

2

Landing shot of a modified version of the Avro Vulcan shows the big spoiler-brakes extended.

3

Although several new U.S. and British planes are probably faster than the Fairey Delta 2, it once held the official world speed record of 1,132 mph.

4

The Saunders-Roe SR.53 features the combination power supply of an Armstrong-Siddeley Viper turbojet and a de-Havilland Spectre rocket which allow this interceptor an extremely high rate of climb immediately upon take-off.

5

The Vickers Supermarine "Scimitar" is an unusual multi-purpose fighter powered by two Rolls-Royce Avon engines. It is one of the few supersonic fighters to use boundary layer control for slow flight into carrier landings. Our Lockheed F-104 is a faster plane utilizing boundary layer control, but it is not employed for carrier landings.

6

While the top speed of the English Electric P.1B has not been announced, it has flown well beyond the 1,132 mph mark. Its low-speed handling, however, is claimed by its manufacturer to allow landing in half the space usually required for jet fighters.

7

The Miles M.100 Student, designed as a beginning trainer and liaison plane, has exceptional maneuverability at an amazingly low price tag of under $40,000.

THE CHALLENGE OF BRITISH DESIGN

OUR AMERICAN accomplishments in aviation have been so impressive and our national pride so well founded that we are always in danger of slipping over into too much self confidence. Here lies the fine line of danger. The Soviet Sputnik is a fortunate jolt into a greater sense of reality. We can thank God it was not an atomic Pearl Harbor. Anything which serves to keep sharp our sense of reality is a contribution to our security. The reader may study these pictures with profit to that end. Public opinion at this point probably holds that even though the Soviet is ahead of us in missiles, we certainly lead the world in manned aircraft.

But we can not surely know this. These pictures of British aircraft challenge any sense of complacency. The significance of some of them is that they are not merely prototypes or experimental craft. The British delta-wing bombers, for example, are in operation, while our B-58, albeit superior in promise, is still several years away from squadron activity. The Saunders Roe SR-53, combining rocket and jet power, may prove to be as revolutionary for interception as was Frank Whittle's original jet engine in cutting down V-1 attack. The carrier-borne supersonic fighter, the Vickers Supermarine "Scimitar," with exceptionally slow landing characteristics, is a thought-provoking effort in Naval hardware.

The reader will remember noting the features referred to in the various picture captions, that these are the ingenuities of a nation popularly interred in history. I can only comment that if such development is produced by corpses, Providence has become singularly active in Great Britain, and we have double cause for gratitude that the British are our staunch allies.

The whole point is, of course, that we are far from having a corner on manned aircraft effectiveness and have no justification for complacency in this area—an area which the editor, for one, thinks will, for some time to come, be decisive of military power. We think Mr. Khruschev knows more about vodka than psychology, but that his aircraft designers are not to be discounted for a minute.

THE EDITOR

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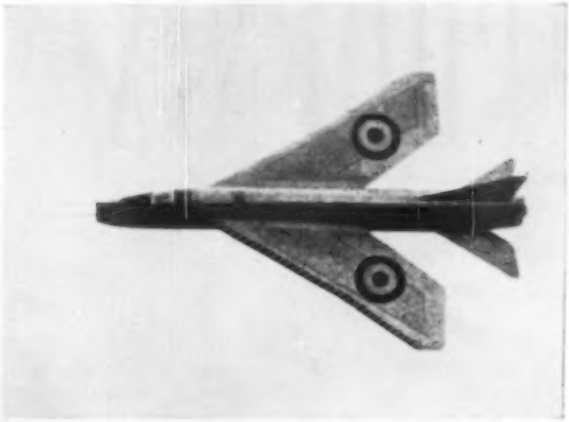


7

Training beyond minimum requirements assures that no PFS graduate washes out later as a pilot.

SALUTE TO PHOENIX

By AL LEACH

Camelback Mountain rises between the citrus groves and arid desert to background a PFS Champion on a training flight. Another student snapped the picture of this solo flight.

AMONG THE MYRIAD municipal school systems of America, that of Phoenix, Ariz., is the equivalent of a Nobel prize winner for development of a student body to be at home in the air age.

The Phoenix Board of Education, its High School and Junior College officials and the students themselves have established a far-reaching influence. Many areas of national endeavor cherish the quality of graduate who comes from the Southwest city. Director of Education for the Civil Aeronautics Administration W. E. Johnson, has said Phoenix is "Exhibit A" in public education. The United States Air Force has cited the Phoenix Union High School and College system for meritorious service. The aviation industry and the air lines have benefited copiously from the succession of graduating talent. But profoundly important above all skills taught in the field of aeronautics, is the breadth of vision the program has generated in the upcoming generations of the area.

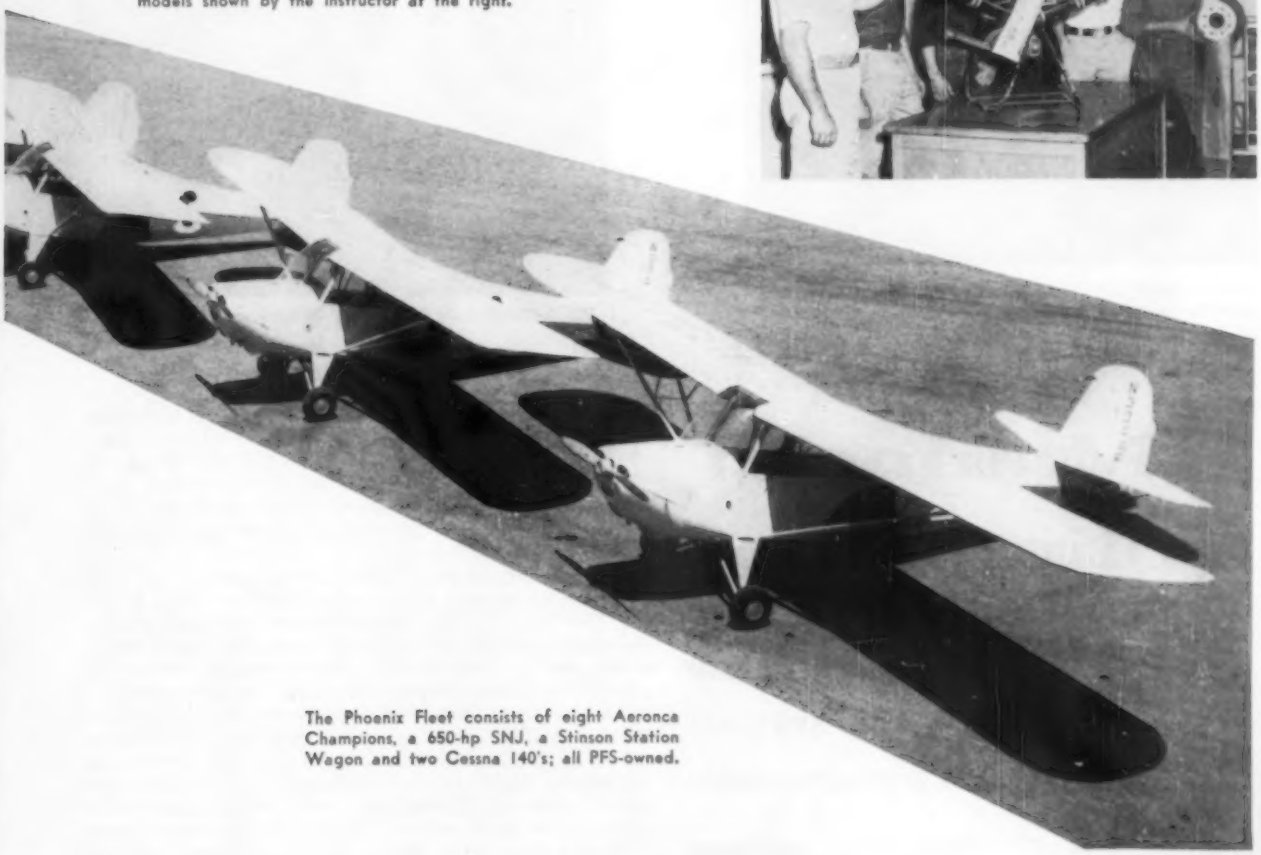
"Phoenix," says a sage commentator on civil affairs, "is guaranteeing itself that opportunity will not easily escape its attention in future years."

And as far as safety is concerned—a subject which is always introduced by skeptics on the subject of aviation in public education—the Pheonix boys and girls have logged 28,000 flight training hours in eight years without a scratch to a youngster and with but one bill for aircraft repairs. A student taxied over a runway light and the damage was $11.67—the material damage, that is. The damage to his pride was something more than a hundred million dollars.

The designation of the public school activity, which actually serves seven different high schools and one junior college in Phoenix, is the Phoenix Flying School. The courses given, whether in flight training, aircraft maintenance or related science, are strictly curricular. This is no part time, extra-curricular, school hobby business, although it did get off the ground rather modestly.

The Flying School was originally launched in 1945 with the purchase of one airplane authorized by the Board of Education. By the next spring, the School owned three aircraft and its activities were organized in three units, or clubs, one composed of high school students and two of junior collegians. The concept of the public school program had been stimulated when (*Continued on page* 82)

Insight to the structural framework of a light airplane is provided by visual aids as above. Engines and props are studied by the cutaway models shown by the instructor at the right.

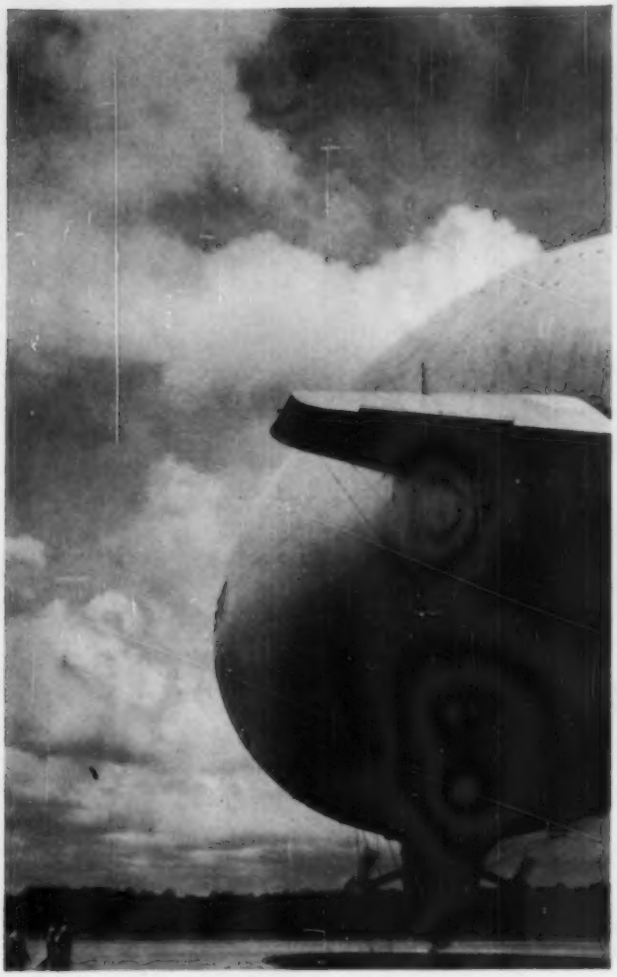


The Phoenix Fleet consists of eight Aeronca Champions, a 650-hp SNJ, a Stinson Station Wagon and two Cessna 140's; all PFS-owned.

LIGHTER-THAN-

A maze of instruments confronts the pilot and copilot in the cockpit of the ZPG-2W airship preparing for take-off.

Lt. R. K. McDonald, the navigator, gives directions to the pilot over the airship's intercom. Radioman sits at the right.



All lighter-than-air aviators are volunteers, and only men who

Making of a blimp pilot

Ten years ago it took eight months to train an LTA pilot. Now it takes 17 weeks.

By BILL KREH

NAVY 3K CRUISED smoothly, 500 feet above the Atlantic; below us, the shadow of our cigar-shaped, 265-foot blimp slipped along. We'd taken off from the Glynco Naval Air Station near Brunswick, Ga., where all Navy blimp pilots are trained before joining one of the anti-submarine squadrons patrolling off the east coast.

All lighter-than-air aviators are volunteers, and only men who are already pilots are accepted for blimp training. That hasn't always been so. A few years ago, an officer could apply for such training without any previous air experience. In 1948, however, policy changed. It seemed a good idea to have all pilots understand what their teammates were up to. Pilots and crewmen in LTA and heavier-than-air started changing places. Men who'd never been off the ground in other than a blimp reported to Pensacola for regular flight training, while experienced naval aviators began airship training. Both groups gained new ideas and skills. Formerly it took eight months or longer to train a blimp pilot. When the (*Continued on page* 65)

AIR TO THE FORE

are already pilots are accepted for Navy blimp training.

Ground handlers scatter as the signal is given for an airship to take off from the tarmac of a U. S. Naval Air Station.

ZPG-2W airship is shown en route to the patrol area, flying over the New Jersey pine woods. Lakehurst lies below.

Blimp on radar guard

Could lighter-than-air craft keep continuous all-weather patrol for sustained operating periods?

By CDR. GEORGE CORNELIUS, USN

AVIATION HISTORY was made on January 25, 1957. On that day, a U. S. Air Force jet bomber landed at Hanscom Air Force Base, Mass., in 3:47 hours after take-off from California. It made headlines.

But the most important aviation event of that day scarcely made the papers. A small item covered the landing at South Weymouth, Mass., of a Navy ZPG-2 blimp after a "routine" patrol of 24 hours, not uncommon in lighter-than-air flying.

How, then, did this landing make aviation history?

The ZPG-2 was one of five airships taking part in the third phase of a significant experiment. The first phase of this experiment determined ground handling characteristics of airships in adverse weather. The second phase checked icing conditions and the ability of blimps to cope with them. With the first two phases successfully completed, two ZPG-2 airships from NAS South Weymouth and three ZPG-2Ws from Lakehurst, N. J., were designated to carry out a final assignment. They were to determine: Could lighter-than-air (*Continued on page* 67)

The 1958 Piper Tri-Pacer 160, powered by a 160 hp Lycoming 0-320-B engine, cruises at 134 mph using 75 per cent power at 7,000 feet.

THE 1958 PIPER Tri-Pacer, N-8492D, spanking new off the production line, stood in front of Flight Operations at Lock Haven, Penn. Its modernistic paint job gave its lines a forward sweep, and its overall appearance suggested cross-country performance and easy handling and this I later found to be factual. Wally Smith, assistant general sales manager at Piper, and I examined some of the plane's refinements—the major one of which is the larger engine—160 hp.

The powerplant is a Lycoming 0-320-B which churns up 160 hp at 2,700 rpm. As compared to the engine of the 150 hp Tri-Pacer, the new 0-320-B engine supplies a 10 hp increase at an additional weight of only six pounds. It has a higher compression ratio which, in addition to added power and performance, offers better fuel economy. Smith said the new engine burns .45 pounds of fuel per horsepower hour in contrast to the former .50 pounds. This amounts to some 11 per cent savings in gas consumption. Incidentally, the new Lycoming burns 91 octane fuel as compared to 80 octane burned in preceding engines powering the Tri-Pacer line.

Checking other specifications as between the 150 and 160 Tri-Pacers, I noticed that the wingloading remains the same at 13.5 lbs./sq. ft., while the power loading for the 160 is 12.5 lbs/hp as compared to 13.3 for the 150.

The large, conveniently located baggage compartment, weightwise can handle 100 pounds. In fact the "160" seems exceptionally adaptable for cargo utility, since the rear seat can be removed without tools in a few seconds, and an additional 42 cubic feet of space made available for 600 pounds of material. I noticed that the skin surfaces, inside and out, are finished in Duraclad, a fire-resistant butyrate dope, while the metal surfaces are painted with enamel.

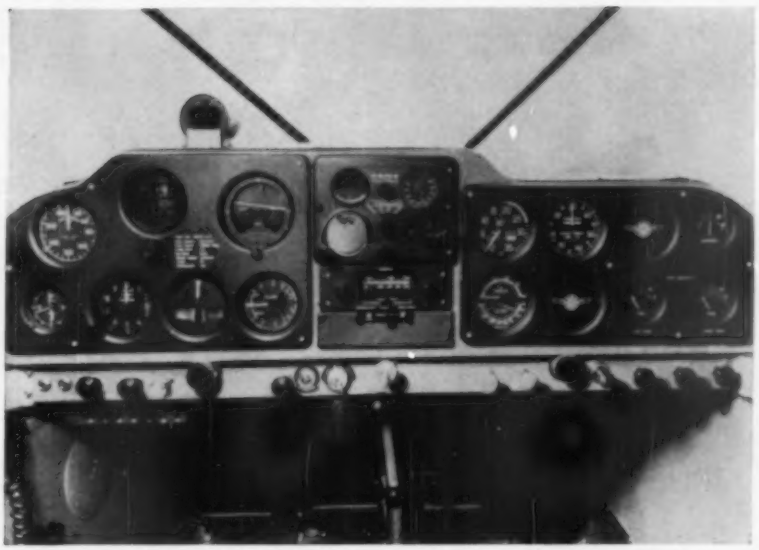
The cabin is agreeable in color harmonies and overhead, a broadcloth headline conceals the layers of insulating and soundproofing fiberglas. As I climbed in, Wally mentioned that a new crush-resistant seat material, polyurenthane, is being used this year to make for more comfortable riding. After adjusting the seat to allow my long legs full travel on the rudder pedals, I went over the location of all the controls. Two 18-gallon tanks located in the wings are controlled by a fuel selector valve located on the left wall near the pilot. Two electric fuel gauges on the panel give a continuous reading on the fuel supply. An optional eight-gallon auxiliary gas tank can be fitted under the rear seat.

As the airplane had been pre-flighted by a mechanic, I switched the fuel selector to right tank and went into the starting procedure. The master switch and starter button are located at the left front bottom of the pilot's seat, easily reached by dropping your left arm. When the throttle is cracked, primer locked, mixture rich, carb heat cold, and ignition on "both", the Lycoming starts eagerly. A touch of throttle and the Tri-Pacer begins to roll on the hard surface. Taxiing out for take-off, I had two

1958 PIPER TRI-PACER 160

The latest version of a popular and time-tested airplane features a new, more powerful engine plus ease of handling.

By TED DUROSKO



Instrumentation of the Tri-Pacer 160 is planned for maximum pilot convenience.

distinct impressions: one, the excellent visibility over the nose; two, the easy ground handling of the craft. Need for separate toe brakes is eliminated with the tricycle gear. A single handbrake applies equal braking to each main wheel. Stops are sure and positive. This feature along with the steerable nose wheel which can turn throughout a 40-degree arc, makes for excellent ground handling.

Take-off is practically effortless on the part of the pilot. Flap settings have three position: up, one-half down, and full flap. For maximum effect in landing and take-off, the full flap position is used. If flaps are to be utilized, they may be applied as take-off speed is approached. In such case the take-off run will be reduced by 20 per cent. Flaps may be lowered before the take-off run is started, but naturally will reduce acceleration of the plane if kept down throughout the take-off.

As we had several thousand feet of hard runway in front of us, I elected to take off with no flap. The 160 has rapid acceleration and when 60 mph has been attained, a little back pressure on the control wheel eases it off and into a climb. For take-offs in heavy grass or snow, drag on the landing gear can be reduced by raising the nose wheel clear shortly after the throttle has been opened.

In the climb-out at Lock Haven, with full fuel load (36 gallons) and two 185-pounders aboard, the plane lifted to 4,000 feet at 800 fpm. Best rate of climb speed is 84 mph. After the climb through a layer of rough air, we started the cruise performance checks, setting up 2,350 rpm and a manifold pressure of 22 inches. This was a power setting of 65 per cent and the speed trued out at 125 mph. Staying at the 4,000-foot level, I flew the Tri-Pacer in a series of steep and normal turns—it responded with excellent stability. Next I checked out the "simplified controls." This involves the rudder and ailerons, the two basic controls used for straight flight and turns, which are flexibly interconnected to provide automatic coordination for simplified handling in flight.

The interconnection incorporates a spring, located behind the baggage compartment, and is arranged so that in level flight a movement of the ailerons results in proper rudder action to make a coordinated turn; yet the controls can be crossed if desired for slips. I found that the aircraft can be flown equally well with rudder or wheel alone, or with both controls. This feature has advantage on extended cross-country.

Stalls, both power on or off are gentle. The Tri-Pacer gives ample warning with a moderate buffeting. There is some aileron control right through the stall, and the rate of sink is about 350 fpm. Stalling speed is 49 mph with full flaps. A slow-flight check was made, with the engine retarded to 1,500 rpm. Airspeed indicated 55 mph (flaps were lowered all the way) and there was good control throughout. At 7,000 feet with 75 per cent power, the speed trued out at 134 mph. (*Continued on page* 64)

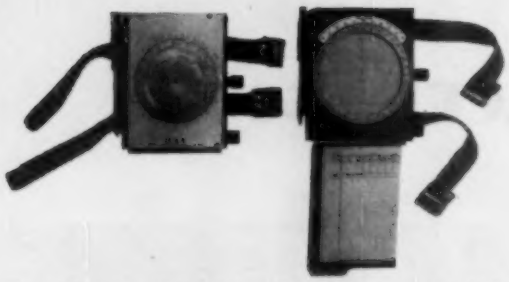


Fig. 1 shows the original Dalton "Model G" computer which was adopted by the RAF and RCAF during World War II.

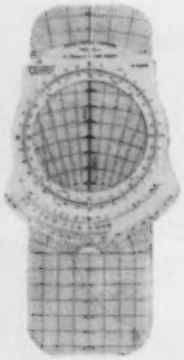


Fig. 2 (above) Dalton E6-B computer used by most pilots today. Fig. 3 (right) shows the face of the new Weems Heitor E-10-A vector-solver.

PHILIP DALTON'S FABULOUS COMPUTERS

Since his original design, none of his successors have improved on Dalton's solution of wind triangles.

By G. D. DUNLAP

Technical Director, Weems System of Navigation

THE ABILITY OF MAN to find his way around his world has been a basic ingredient of human progress. Radical steps in the advance of civilization have been marked by improved methods of navigation. Seapower could not become a force until the chartless wastes yielded to navigational ingenuity; and this is even more true in the case of airpower.

So although the modern navigator deals in unromantic mathematics and scientific data, the end product of his activity is a mighty power and a high romance. Society would largely grind to a halt without him.

On June 30, 1936, a routine patent application was filed in the U. S. Patent Office by a young Naval Reservist, Lt. Philip Dalton, under the title *Plotting and Computing Device*. Later patents and developments led to the fabulous success of the long line of computers emanating from this original—a success which has far exceeded the most visionary expectations of the inventor, who met his death in the service of his country.

During World War II, the name Dalton and the unglamourous designation, E6-B, became synonymous with navigation computers. The RAF and RCAF quickly adopted the "Model G" Computer (Fig. 1) which was actually the basic design of Lieutenant Dalton. The Model G, although no longer manufactured, is still used and sold as a result of the number released by War Surplus. In the United States, the Dalton E6-B (Fig. 2) which has the speed scale and drift lines on a rigid slide instead of an endless roll, is used by most airline and private pilots. It is impossible to estimate how many hundreds of thousands were, and still are, being manufactured for the military forces. P.V.H. Weems, of world-wide navigation fame, assures us that over 100,000 new E6-B Computers have been distributed commercially since WW II.

The E6-B design has until now gone through comparatively little physical evolution. As the speed of aircraft increased, the slide containing Air Speed arcs was lengthened and the computer designated the E-10 by the Air Force. Scales were added to the slide rule side for solving Pressure Pattern problems, Mach number, Compressibility effect on Air Speed, etc., but no basic changes were made on the face (wind triangle) side of the computer. The latest Air Force model, the MB-4, maintains the original Dalton design on the face of the computer.

Since Dalton's original design there have been dozens of others developed without discovery of a simpler or more accurate method of solving the wind triangle. This lack of evolution is rare in technical instrument history and a monument to the genius of Philip Dalton. Many other designs have, of course, had their place in special purpose computers. Numerous pocket-size models for pilots interested primarily in slide rule problems have been developed. The wind problems, if desired, also can be worked on logarithmic scales or graphs. For Naval Aircraft Carrier use, where relative motion problems must be solved with great accuracy, the Plotting Board, also originally designed by Dalton, has been and is the basic instrument. The slide of a Dalton E6-B Computer is in effect a segment of a plotting board.

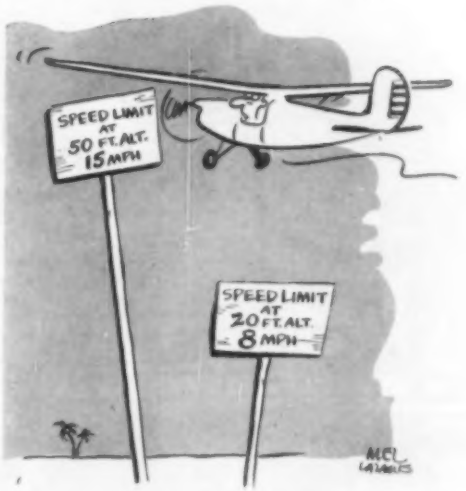
It was, however, no great surprise when a new design for the face of the E6-B recently appeared. The surprising fact is that the ideas came from a flight dispatcher rather than a navigator or pilot. This was no doubt a result of the need for the dispatcher to solve one problem over and over again.

Mr. A. L. C. Heitor, a Portuguese citizen and flight dispatcher for Scandinavian Airlines in Lisbon, persisted in his belief that the slide rule should be automatically positioned for ascertaining time to cover a given distance after completion of the wind triangle solution; and that the wind problem itself could (*Continued on page* 58)

Back in 1908, a sleepy Florida cow town enacted the world's first aviation legislation.

KISSIMMEE MET THE AIR AGE

By GLEN HALE BUMP



ON JULY 17, 1908, KISSIMMEE, Fla., enacted a municipal aviation ordinance and set a precedent which has had many enthusiastic emulators over the ensuing years.

Historians won't bet that Kissimmee led the world in aviation regulation, but do affirm that it led the United States! The Air Force pamphlet, "Historical Data: A Chronology of American Aviation Events," shows that the Kissimmee ordinance was certainly the first on record.

Kissimmee's other claim to fame is as the "cow capital of Florida." How or why this hamlet got interested in aviation so early no one seems to know.

However, Kissimmee folks have had great fun all these years joking about their aircraft ordinance. Sam Lupfer, a local business man, even has it reprinted to hand out as an advertising gimmick.

"For the purpose of this ordinance," declares the now somewhat famous document, "the boundaries of the airship limit of the town shall be to extend upward 20 miles, and the limit of the town shall be the same as the fire limit."

The 11-section law set up a license fee of $100 for keeping an "airship shed, barn or garage" and fees for airships kept or used for hire within the town. Some of these were "Balloons, stationary $20; powerless, $30; dirigibles, $50. Aeroplanes, $100, heliocopters, $150 and ornithopters, $200."

The fees were to be increased according to the airships' carrying capacity, from 10 per cent for a 5 to 15 passenger job, up to a 400 per cent bite for an airship hauling over 1,000 passengers. The Kissimmee folks definitely were forward-looking! The aircraft industry has not caught up to them yet on capacity.

There had to be speed limits, of course and, though Florida skies are usually sunny, those early city fathers were way ahead of any overenthusiastic cow-puncher who might try to buzz Main Street on the excuse of a low ceiling.

"No powerless balloon, aeroplane, heliocopter, ornithopter or other type of flying machine or airship shall travel upon any street or alley of the town within ten feet of the surface; or within 20 feet of said surface at a speed greater than eight mph; or within 50 feet at a speed greater than 15 mph; or within 100 feet at a speed greater than 25 mph." There was more, finally ending with a maximum speed of 200 mph at 1,000 feet altitude.

The late P. A. Vans Agnew, then city attorney, and the late Judge T. M. Murphy, then mayor, fell a little short on the speed angle. During the last war an air base was established at Kissimmee and, while no fighter plane of record came screaming up an alley under ten feet altitude, most did usually exceed eight mph. And now there is even more violation in prospect for the aviation ordinance of Kissimmee. The Martin Company is building a guided missile plant just ten miles north of main street.

What made cow-conscious Kissimmee leap to the defense of its citizens so early in the air age? Was a herd of steers stampeded by a "powerless balloon, aeroplane, heliocopter or ornithopter traveling within 20 feet of the surface at a speed greater than eight mph?"

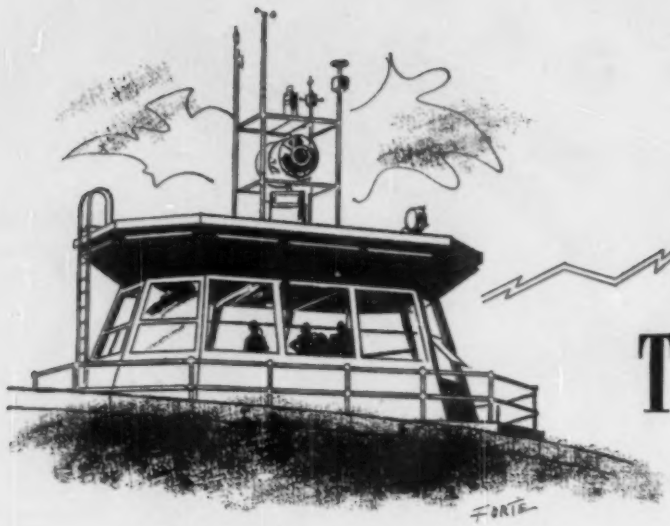
No, there is no record of any such doings until three years after the conscientious Mr. Vans Agnew drew up his warning to operators of aircraft. Perhaps he acted on premonition, however, because sure enough, one day in 1911 Kissimmee's first flying machine, on its very first take-off, killed a cow. This unhappy circumstance nipped the city's chances to boast an early flying school which the pilot intended to establish.

Kissimmee Gazette reporter, Max Norris, who recently brought the story to light, believes the ordinance was dreamed up by the attorney as a practical joke on Mayor Murphy. If so, Vans Agnew was thorough in propounding it. Note this from Section 9: "All such balloons or airships shall be properly equipped with, and shall use, such bells, whistles, or horns, brakes, lights and other signaling and controlling apparatus, and net, parachutes, flying belts and artificial wings, and other safety apparatus as are prescribed by the rules and regulations adopted and enforced by the aeronautic bureaus of the United States government." (No such agency even existed until 1926.)

The best of intentions, however, led to the usual frustration. The city treasury apparently never got in shape to follow through with its part of the deal. "As soon as practicable," declared Section 10, "the council shall purchase an aeroplane of approved modern type for the use of the marshal in performance of his public duties, and enable him to properly enforce the provisions of this ordinance."

Maybe the marshal never learned to fly, (a bad mistake for anyone) even though the money was appropriated. "Anyhow," says Mr. Lupfer, "up to this date, the Police Department hasn't attempted to enforce the ordinance because the city has failed to provide the 'aeroplane of approved modern type.'"

Perhaps currently the councilmen are too busy working on an ordinance for regulation of space ships. They must be excited by all this talk of satellites. A town can't be too careful nowadays! What might discovery of good grazing land on the moon do to the price of cattle in Kissimmee? END



TALK GOOD LIKE

Chitchat must go, when you figure what

IN DAYS OF OLD, when knights of the air were considerably younger, if not bolder, lonesome pokes could pick up a mike and shoot the breeze with tower operators and traffic controllers. It was a family affair, casual and homey. Clearances were loosely-worded things: a stack was still a pile of pancakes; and communications were as personalized as a pair of old sneakers. But as you've undoubtedly noticed, something new has been added in communications.

What started with the Wright Brothers as a do-it-yourself business has grown into a mass production with propwash at altitude too often experienced. If you recall your early brainwashing in arithmetic, 20.6 million radio transmissions in a year is a lot of talking. But when you figure out what a predicted 50 per cent increase in a few years will do to the already over-loaded communications system, you realize that chitchat and gobble-de-gook have got to go.

The ideal set-up would be a catered affair where the pilot would not need to worry about trying to get his message over the air. It is on the designing boards. Telemetering techniques will automatically accomplish air-to-ground transmission of position, track, speed, altitude, weather information and other data required. For the pilot, the ground-to-air intelligence will be in television form in the cockpit.

That will be *some* day. In the meantime, radiotelephoning will have to be "leaned out" so that every pilot will be able to communicate by using standardized procedures, proper phraseology, and "recaduberating" (shaping up).

A radiotelephone contact comprises four parts: call-up; reply; message; acknowledgment. The initial call consists of (1) identification of the station called; (2) THIS IS; (3) identification of the aircraft; (4) OVER. This is a f'r-instance: SAN FRANCISCO TOWER, THIS IS ER-COUPE THREE ZERO ON ONE ONE EIGHT DECIMAL ONE, OVER.

The normal reply is about the same except that it is not necessary to identify the answering frequency; and the transmission is ended with GO AHEAD or STAND BY. (If the reply is STAND BY, no acknowledgment is required.) When there is a question of readability, request a signal check or change of frequency *before* attempting to copy the message. When the ground station asks, HOW DO YOU READ? the following scale should be used: UNREADABLE; READABLE NOW AND THEN; READABLE BUT WITH DIFFICULTY; READABLE; PERFECTLY READABLE (LOUD & CLEAR).

There are times when communications volleys can be clipped short. A shortened form of procedure may omit such words as STAND BY, OVER, THIS IS, ROGER, etc. After initial contact has been established, continuous two-way communications may be conducted without further identification or call. A message may be sent without awaiting reply to the initial call when it is certain that the call will be received and no interference will result.

This is the sequence of radiotelephone contact from blocks to blocks:

Preflight: When feasible, call the tower for a radio check *before* starting engines.

Taxi: Don't leave the blocks without a taxi clearance from the tower or ground control. Ask for taxi "instructions" only if you are lost. While taxiing or at the end of the runway, request ATC clearance, altimeter setting and runway winds. (Always get clearance before crossing runways.) Have a pencil and paper handy to copy an ATC clearance. You may know the route like the palm of your hand, but the departure might be a double reverse due to traffic. The worst bottlenecks in communications are repeats due to pilot inability to get the clearance the first time. Some readbacks sound like broken records.

ATC clearances are still in the "Four-C's":

C—CLEARED TO . . .
C—CLIMB TO . . .
C—CROSS . . .
C—CRUISE . . .

Here are shorthand symbols used by CAA tower operators for ATC clearances:

1. **C** ATC CLEARS
2. **R** RANGE
3. **Z** TOWER
4. **A** AIRPORT
5. **↓** DESCEND TO (ALTITUDE) IMMEDIATELY
6. **↑** CLIMB TO (ALTITUDE) IMMEDIATELY
7. **→** CRUISE
8. **X** CROSS
9. **~~M~~** MAINTAIN
10. **H-NE** HOLD—(DIRECTION)
11. **5/LAX** MAINTAIN 5,000 UNTIL REACHING (FIX)

By CHUCK BANFE
Captain, Pan American Airways

AN AIRMAN SHOULD

threatens our overloaded communications system.

12. **VFR/5E** MAINTAIN VFR UNTIL 5 MINUTES (DIRECTION)
13. **5/1020E** MAINTAIN 5,000 UNTIL (TIME)
14. **1/OTP** MAINTAIN 1,000 ON TOP
15. **8 ↓ 5** CRUISE 8,000, DESCEND TO 5,000 **1020E** AT 1020E
16. **5 ↑ 9** CLIMB VFR FROM 5,000 TO 9,000, IF NOT **VFR (5)** POSSIBLE, MAINTAIN 5,000
17. **RL** REPORT LEAVING
18. **RR** REPORT REACHING
19. **RT** RIGHT TURN AFTER TAKE-OFF
20. **LT** LEFT TURN AFTER TAKE-OFF
21. **RS** RIGHT SIDE
22. **LS** LEFT SIDE
23. **EAC** EXPECT APPROACH CLEARANCE (TIME)
24. **NO DLA** NO DELAY EXPECTED
25. **DLA INDFT** DELAY INDEFINITE
26. **UFA** UNTIL FURTHER ADVISED
27. **APC** APPROACH CONTROL
28. **SIA** STRAIGHT IN APPROACH
29. **IX** INTERSECTION

Example.

"SAN FRANCISCO ATC CLEARS CESSNA FOUR SIX EIGHT TO THE SEATTLE-TACOMA AIRPORT VIA VICTOR AIRWAYS. CLIMB VFR TO NINE THOUSAND FEET. IF NOT POSSIBLE MAINTAIN FIVE THOUSAND AND ADVISE."

"C 468 SEA A VA $\frac{\uparrow 9}{\text{VFR(5)}}$ ADV"

After engine runup is complete, switch from ground control frequency to tower and request takeoff clearance.

After Take-Off: If the tower has not notified the pilot to change over to Departure Control immediately after take-off, he is cleared to leave tower frequency. Otherwise, change to Departure Control as soon as possible for there may be traffic in the area and Departure Control will be monitoring the radar scope. If there is a ceiling or restricted visibility, the pilot should report it.

Enroute: Pilots are required to report the Position, Time and Altitude of passing each designated reporting point on the route being flown. It should be done in the order of a rule-of-thumb, "PTA" for Parent Teacher's Association or Position, Time and Altitude. Communications channels are gummed up with a needless number of calls to aircraft which are late reporting at check points. If a pilot is three minutes late over a reporting point, he *must* re-estimate to eliminate superfluous calls. If a pilot encounters unforecasted or significant weather, he should relay it, as soon as possible, for transmission to the Weather Bureau. Such pilot reports are the heart of forecasting! Occasionally, ground stations can not read back position reports because of a busy circuit. In that case, say over Grand Falls, the ground station would simply acknowledge, GRAND FALLS, OUT. Most non-scheduled calls are for weather, clearances or special messages. Therefore, be ready with pencil and paper. Copying weather transmissions is a healthy idea for, in the case of terminals and alternates, it can give a trend.

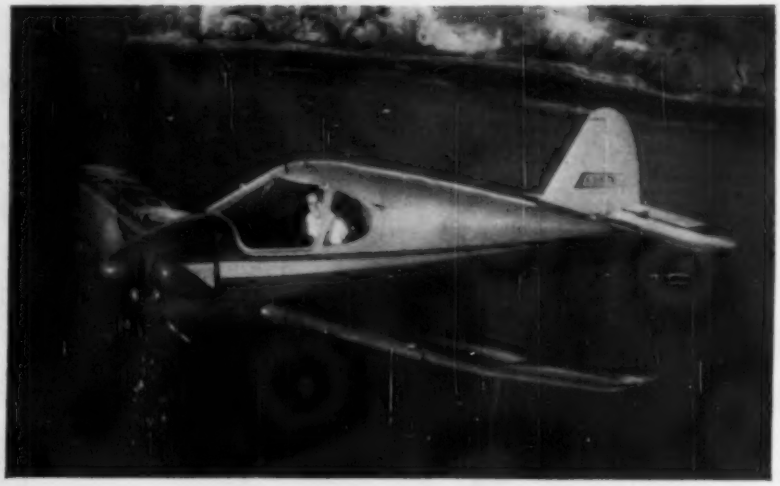
Approach: A pilot can save a ream of radio calls by having frequencies set up ahead of time. Often he can get a party-line view of the local traffic, the latest weather, and the active runway. In Approach Control zones, traffic is apt to be like a department store basement during a Spring sale, so it behooves a pilot to contact Approach Control precisely at the time indicated or at the required check point.

ATC clearances are still in the "Four-C's":

C—CLEARED TO . . .
C—CLIMB OR DESCEND TO . . .
C—CROSS . . .
C—CRUISE OR HOLD . . .

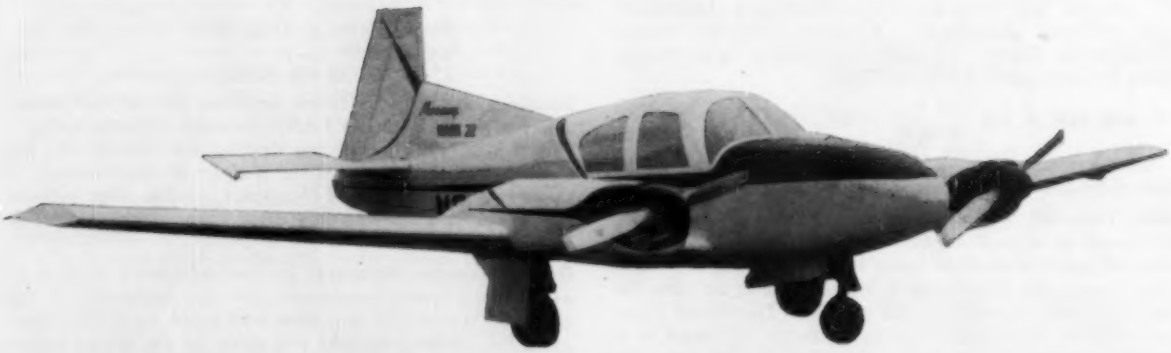
Landing: Be sure to check on base leg to the tower. When a CLEARED TO LAND message is given, no further report is needed. After landing, the pilot should get taxi clearance as soon as he is clear of the runway. If there is a ground control frequency, change over without the tower calling, but only *after turning off the active runway.*

Good Mikeside Manners: In radiotelephone high society, good mikeside manners are the hallmark of top pilots. It is essential that each pilot know all of the shortcuts, for communications are going to get worse before they get better. Toss into the witches' brew of increased traffic a pinch of static, a liter of weak signals, a dab of interference, and it is crystal-clear why the pilot is faced with getting his message sand- (*Continued on page 86*)

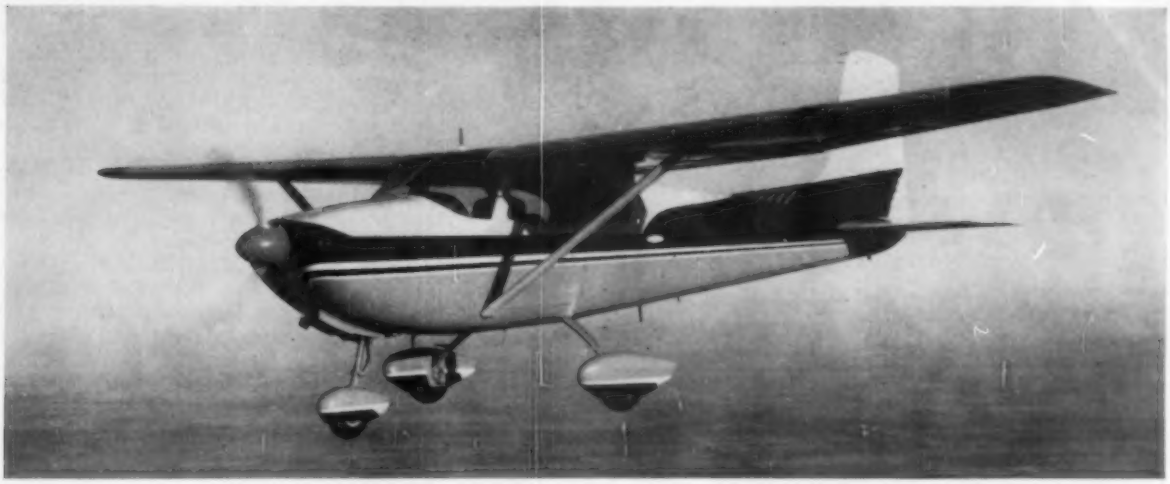


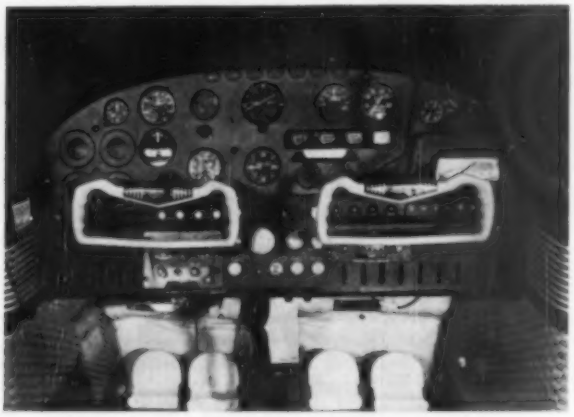
SATELLITE Right: Many friends of the postwar Culver V will be glad to know that an improved version of the airplane is now in production by the Superior Aircraft Co., Culver City, Calif., who in 1956, bought up all physical assets of the former Culver Aircraft Corp. The Satellite, as the airplane is now named, is powered by a 90 hp Continental engine, has a cruising speed of 130 mph and a range of 750 miles. Forty-five are presently in production with 15 nearing completion.

KAMAN H2UK-1 Left: Mockup of the latest Kaman utility helicopter for the U.S. Navy is equipped with a retractable landing gear. Contract calls for delivery of a number of prototypes powered by General Electric T-58 turbine rated at 1,050 shp. Kaman is an early pioneer in the application of turbine power to helicopters, having built and flown the K-225 equipped with a Boeing turbine, which is now exhibited at the Smithsonian Institution. Like all Kaman craft, the H2UK-1 has the servo-flap control system.



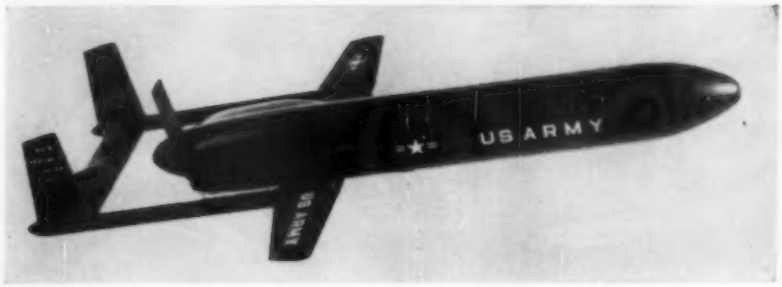
TWIN-ENGINE MOONEY Above: Latest product of Mooney Aircraft, Inc., the twin-engine Mark 22, is presently going through final tests prior to being offered to the private and business aircraft market. Prototype, shown here, is powered by two 150 hp Lycoming engines, production aircraft will undoubtedly have powerplants of 180 hp. The Mark 22's fuselage is the same as that of the single-engine, four-place Mark 20, 1958 version of which is now powered by the 180 hp Lycoming and has a cruising speed of 180 mph.





CESSNA SKYLANE Above: A more sophisticated version of the popular "182", the Skylane is a new addition to Cessna's "middle line" of aircraft. It is offered for sale with a full instrument panel which includes directional and horizontal gyros, outside temperature gauge, turn-and-bank indicator and choice of either Lear or Narco omni-tranceiver with crystals and low frequency range as standard equipment. Optional accessories available are Tactair T-3 automatic pilot and 18-gallon auxiliary fuel tank which can be installed in the baggage compartment. Like the 1958 model of the 182, the Skylane features directional trim control consisting of a rudder trim-tab. Main distinguishing features are the fiberglas wheel fairings said to increase top and cruising speed 3 mph over the 182. Interior appointments are more luxurious and are in contrasting colors. All Skylanes are fully painted and there is a choice of eight colors permitting some 500 different combinations. Power is supplied by a 230 hp flat six Continental 0470-L engine, top speed is 168 mph, cruising speed is 158 mph.

HAVE YOU SEEN?



SURVEILLANCE DRONE Left: Designed and built by the Guided Missile Division of Republic Aviation Corp. for the U.S. Army, the SD-3 surveillance drone will serve as an aerial spy capable of observation under all weather conditions because of its advanced surveillance-sensing equipment. Interchangeable nose pieces permit switching from one system to another such as photographic, radar or infra-red.

NO. 217

I LEARNED ABOUT FLYING FROM THAT!

This Banshee pilot was almost overtaken by the Dark Angel on a routine night patrol mission.

By WARREN H. O'NEIL, LCDR, USN

THE SUN IS SETTING, and darkness is rapidly drawing its shroud over the Task Group. The Banshee jet fighter is howling in protest against the lines that hold her to the deck. I apply full power, and the howl changes to a roar of frustration as she strains to be free. A quick check of the instruments, lights on, okay to Catapult Officer, head back, a brief pause, and I am shot into the dusk like a pebble from a slingshot.

Landing gear up, wings level, canopy closed, flaps up. As the canopy is closing, I note that the left gear has failed to retract. I slow down, check and reset the blown circuit breaker, and the gear retracts. In a few seconds I have gone from zero airspeed to 300 knots, and am climbing.

One turn to reverse course and Blue Two slips across the arc into radar chase position astern. I make a quick radio check with my wingman. Now I must establish contact with our controller aboard the carrier.

"Slingshot, this is Blue One with a flight of two Banshees, over you at 4,000, climbing, heading three-zero-zero." As I talk, we pass through a thousand-foot layer of stratus clouds and break into the clear.

"Blue One, this is Slingshot, take station three-zero-zero, 50 miles, one-five-thousand. Orbit easy; we have temporary electronic problems." Radio reception is good with the controller. I recognize his voice and resist the temptation to toss him a greeting.

Slingshot calls. After ten minutes of orbiting and checking radar, instruments, and power settings, his voice is a welcome relief. "Blue One, this is Slingshot. Take station two-nine-zero, 75 miles, 33,000."

I acknowledge and mutter to myself, "That's more like it; these babies were not built for crawling on the water."

I add full power and set up the climb schedule. In a few minutes we are at 33,000 feet on station. Not far to the west is Korea. The Truce Talks are in full swing. Our mission is a routine night patrol and intercept training. At this altitude, we pick up a few more minutes of light from the setting sun.

As we commence the first problem, I am uncomfortable. The cockpit air seems stuffy, and I have the sensation of having eaten too much for dinner. My right engine starts to vibrate, and I forget about my sensations while I adjust for a more favorable power setting. I lower the cabin temperature and try to adjust the tangle of straps, utility lines, and safety equipment that makes life normally miserable in the small cockpit. I begin to perspire and feel nervous.

"Relax boy! You're getting chicken in your old age." I talk freely to myself as I do on all flights. "You shouldn't have eaten those two pork chops (*Continued on page* 62)

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T-Effect . . . A New Phenomenon

(Continued from page 28)

established an approximate ground speed. From our position we figured it would take exactly five hours into Hilo. Usable gas on board figured out to five hours and four minutes! I decided the longer we flew, the lighter we would become and the better the gas reserve would be, so, elected to continue to Hilo."

To get full benefit from what Tyson then believed to be ground effect, the plane was held all the long way at an altitude of about 100 feet until 15 minutes out of Hilo. Of course the crew had to do considerable rotating during the six-hour grind. It required both feet on the right rudder pedal to keep the C-97 on a given heading and no one individual could hold that pressure for that long.

The flight is history. By careful juggling, Tyson was able to keep the aircraft within a very narrow band of air that we now call the T-Effect area. He found it possible to gain airspeed at a reduced power setting and actually "make" fuel, as is reflected in the following table.

Altitude	Manifold	RPM	IAS	Fuel Flow/Hr
150 ft.	44 in.	2,350	150	3000#
50 ft.	42 in.	2,350	150	2800#
100 ft.	39 in.	2,350	165	2600#

It is apparent that the ground effect theory is incorrect insofar as over water is concerned. At an altitude of 50 feet, the aircraft was in danger of being flown into the sea. Performance was slightly better than at 150 feet (less fuel consumption) but the problems of staying at such a low altitude are obvious. However, by easing the 97 up into the T-Effect area, airspeed was increased to 165 mph and the fuel flow further reduced!

A few days after Tyson's flight, the author arranged to run some flight checks for T-Effect with a C-54. Unfortunately, things didn't work out as hoped. Although several low altitude runs were made, the following table reflects the average findings:

Altitude	Manifold	RPM	OAT	IAS	TAS
500 ft.	25 in.	2,300	25C	136	139
100 ft.	25 in.	2,300	25	135	138
80 ft.	25 in.	2,300	25	132	135

As soon as the aircraft descended close to the surface of the water, airspeed would drop and an apparent loss of lift was evidenced. It felt as though the plane was being drawn toward the surface. On each low-level run, after power stabilization, it was noted that the aircraft would change alternately from nose heavy to tail heavy. Attempts to trim out these control pressures resulted in further reduction of airspeed. This in turn led to getting the plane on the back side of the power curve, a most undesirable condition.

Shortly after this test, we discussed the results with Major Tyson. He pointed out that we had used the wrong technique in finding and utilizing T-Effect. "You have to hand fly the aircraft," he said. "As soon as you trim the plane for a no-load condition on the elevators, you've defeated the whole program. Normally, trimming will change the effective angle of attack and increase drag. End result? Decrease in airspeed."

Early in October, arrangements were made to secure another C-54. The writer accompanied Major Tyson for the specific purpose of learning exactly how to get into the T-Effect area and remain there. Three other pilots were on board and it took the better part of four hours to give each man a chance to feel out, recognize, and then fly in the T-Effect area long enough to establish the validity of its existence.

It is reasonably certain that some individuals will question the following figures. In an effort to offset some of the skepticism, the writer photographed both airspeed and altitude as recorded at the navigator's panel. Certainly the limited tests we were able to make will not satisfy the engineers of the aviation industry, nor should they. There's a great deal yet to be learned about T-Effect. We're but making a step in the right direction.

T-EFFECT FLIGHT CHECK
3 October 1957
Total Distance: 300 nautical miles
Area: NNE of Oahu, T. H.

Altitude	Manifold	RPM	IAS (knots)	OAT	TAS
500 ft.	31.5 in.	1,600	147.5	26C	152
400 ft.	31.5 in.	1,600	148	26	152
300 ft.	31.5 in.	1,600	147.5	26	151.5
200 ft.	31.5 in.	1,600	152	26.5	151
100 ft.	31.5 in.	1,600	152	26	155.5
50 ft.	31.5 in.	1,600	143	26	146
125 ft.	31.5 in.	1,600	147.5	26.5	151.5
75/ 90 ft.	31.5 in.	1,600	155.5	26	159

It is significant to note that, as the aircraft descended, airspeed progressively increased down through the 100-foot mark. For the sake of the record, each 100-foot increment was made at ten-minute intervals. Power was reduced and then reestablished at each level and speed allowed to stabilize completely before the instrument panel photographs were made. There was a 9-knot loss of indicated airspeed between 100 feet and 50 feet. Then, as the aircraft was brought up to 125 feet, the speed jumped to 147.5 knots.

At this time, Major Tyson pointed out that we had gone through the T-Effect area twice. "Now," he said, "I want you to feel the airplane down very gently to between 90 and 70 feet. Make no abrupt pressure changes on the yoke. Leave the trim alone. Set the radio altimeter at 75 feet and then use the middle (amber) light as a guide. Finally, watch the airspeed indicator."

At approximately 80 feet, the airspeed jumped to 155.5 knots. We were definitely in the T-Effect area.

For the sake of being completely factual, we have included true airspeed in the foregoing chart. In reality, however, if you should find yourself in a bind and have insufficient power to stay upstairs, then your real interest would be Indicated Speed! That would be the one factor that would govern your power settings. Once in the T-Effect area, you would use the airspeed indicator to determine just how far the manifold pressure could be reduced. Right then you would be interested in two things: prolonging engine life and extending the cruising range.

Here is a tip for flying within that narrow band that makes up the T-Effect area. Trim the plane for level flight *before* getting close to the water. We suggest that the last trim be made not lower than 300 feet. As the aircraft enters this stream of relatively undisturbed air, control pressures will be greatly reduced. However, if the plane is allowed to descend below the T-Effect level, an immediate nose-heavy moment will be experienced (with most aircraft). Conversely, if the craft is allowed to climb above the area, a tail-heavy condition will be evidenced. *Under both conditions the airspeed will decrease.* That alone should give you fair warning that you are getting away from your little helper.

Many runs were made following the one previously recorded. Conditions remained generally the same and airspeed

(Continued on page 54)

NEXT MONTH IN FLYING

RE: AN OPEN LETTER TO THE CONGRESS

The Editor's Open Letter to the Congress in the January issue aroused more comment than any article ever published in FLYING and has been called the most striking analysis yet to be made of the national dilemma. Excerpts from the flood of reaction will be published in the April issue.

THE SUPER VENTURA

A war surplus plane, modified by Howard Aero into a 310 mph business transport, is discussed in an interview with the chief test pilot of Howard Aero and the chief pilot of National Distillers which has owned and operated a Super Ventura for the last year.

PIONEER MECHANIC

From North Beach to Moscow, from Glenn Curtiss to Count von Zeppelin, the trail of mechanic George Hallett blazed the way for the air age.

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(Continued from page 52)

increases of eight to ten knots were experienced in the T-Effect level. Finally, having tracked out for 300 nautical miles and then flown a reciprocal course for approximately 250 miles, the last run was made and is reflected in the following table:

Altitude	Manifold	RPM	IAS	OAT
500 ft.	30.5 in.	1,600	146	24C
400 ft.	30.5 in.	1,600	145	25
300 ft.	30.5 in.	1,600	146	26
200 ft.	30.5 in.	1,600	146	26
100 ft.	30.5 in.	1,600	148	26.5
50 ft.	30.5 in.	1,600	146	26.5
125 ft.	30.5 in.	1,600	148	27
75/90 ft.	30.5 in.	1,600	150	27

It is significant to note that as outside air temperature increases, airspeed decreases. Thus, even though we were descending and crowding into the T-Effect area, the indicated speed made no appreciable jump. We discussed this with Tyson and he pointed at the island of Oahu that we were nearing. "There's your answer," he said. "As soon as you get close to a land mass, you will find that the T-Effect disappears almost entirely. I have pretty well established what I believe to be a fact. Once you are near land and start experiencing the temperature changes that accompany this geographical shift, the T-Effect peters out. There may be several reasons for this. Disturbed air flow from the hills; the beginning of thermals; pressure changes; changes in humidity; all may enter the picture. Frankly, I don't know all the answers."

Before continuing, we would like to refer again to the last chart. It is noted that we gained a little indicated speed by getting into the T-Effect area and, manifold pressure has been reduced. Fuel flow had been reduced also and although not specifically noted during that run, later tests showed how far fuel flow savings can be affected.

On 15 October 1957, a C-124 was made available to Major Tyson and the author. It was our intent to demonstrate T-Effect to a group of experienced pilots. These included the Chief Pilot, Pacific Division, MATS. In addition, the eight men on board were all Aircraft Commanders and actively engaged in flying the Pacific areas. Lumped together, total experience on this particular flight amounted to something over 46,000 hours flying time.

The C-124 has a wing span of 174 feet. We wondered if a machine of such size would require a greater altitude than a C-54 to fit into the T-Effect zone. Up to the time of this flight, we had found the effect at approximately 90 feet above the surface of the ocean. Both the C-97 and C-54 appeared to function more efficiently at this level. We reasoned, however, that the larger aircraft might need to be upstairs a little farther to enjoy the expected performance gain.

In view of the fact that the C-124 was not equipped with a radio altimeter, it was necessary to eye-ball the altitude. This is not an easy thing to do in any aircraft and, in this big machine, it's quite a chore. We worked out a system that appeared to suffice, though not a recommended procedure. While one pilot held the craft at an indicated 40 feet, the writer scuttled down the ladder into the bowels of the beast and peeked out under the wing. Actual altitude above the waves appeared to be between 50 and 60 feet. For the first couple of hours, various members of the group took turns flying the plane, feeling for the T-Effect area. In general, runs were started at 300 feet with stabilized power. Then, gradually the altitude was reduced until, at approximately 90 to 100 feet, an increase in airspeed would be noted. We are being absolutely factual in this report. Some of the pilots felt they were getting the best results at 140 feet. Others believed they experienced the greatest gain at an indicated altitude of 40 to 50 feet. For the most, however, the 100-foot level appeared to be the most satisfactory.

We are the first to admit that tests of this nature are inconclusive. Facilities for proper instrumentation are not at our disposal but we sincerely hope that both the military and civilian engineering people will get into the act. In any event, it was the concensus of the MATS pilots that a definite increase in performance was gained at approximately 100 feet. Several could feel the tendency of the craft to change in control pressure as the altitude varied from low to high. Others could not. That the C-124 is hardly a suitable aircraft for such tests is obvious. But, here again, it is entirely possible that someone may lose a couple of engines on one of these monsters. If that ever happens, we know now that the 124 will get right along about its business down in the T-Effect zone, just as any smaller type flying machine.

After giving all the pilots a chance to feel out the T-Effect, Tyson took over the controls and proceeded to demonstrate a further application of the phenomenon. The engineer was directed to reduce power until an indicated airspeed of 150 knots was established. Fuel flow was recorded after power stabilization. Altitude 300 feet. Next, Tyson started to ease the aircraft down until, at approximately 90 feet, a six-knot increase in speed was noted. Again, several minutes elapsed until it was established that the airspeed would remain constant.

Major Tyson explained the procedure as he went along. "Now," he said, "I'm going to show you how you can 'make' fuel. This is the way I got the crippled C-97 home and, if it worked for me, it will work for you."

He ordered the engineer to start reducing manifold pressure. Slowly it was brought back from 33 inches until, at 26 inches, the airspeed dropped to 150 knots. This power was held constant until it was determined that no further reduction in

(Continued on page 56)

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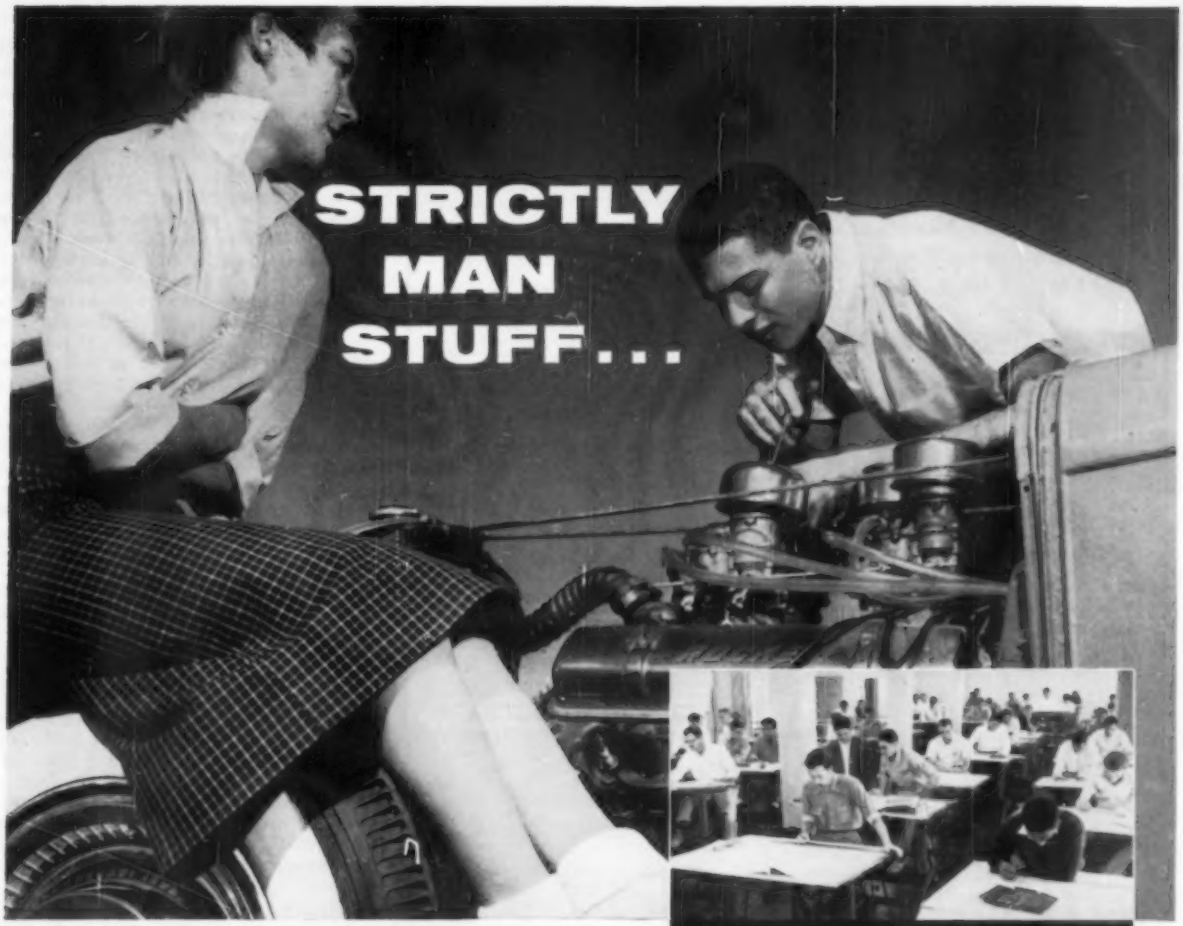

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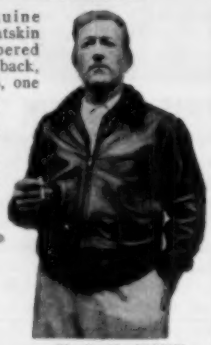

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(Continued from page 54)

speed could be expected and then a fuel flow check was again made. He had reduced the flow exactly 330 pounds per hour and was maintaining the same airspeed as that experienced at 300 feet! He pointed out the advantages of using this procedure rather than depending on an airspeed increase. "At best," he noted, "about all you can expect from getting into the T-Effect area is a moderate increased airspeed of five to possibly ten knots. On a long haul, that would be almost inconsequential. However, accepting minimum speed and planning for the maximum cruising range, it is possible to put another hour of fuel in the bank. *That* is where this T-Effect really pays off."

For whatever it may be worth, we feel another important advantage has been gained already by those fortunate enough to experience flight in the T-Effect area. Without reservation, the pilots declared that they feel much more qualified to handle a ditching since flying down near the water.

Basically, this opinion is most valid. It was our experience, when we first launched on the program, that what we considered good judgment as to height over water was way off-base. Naturally the type of sea makes a great deal of difference, but even over moderate swells, the *impression* is that of being extremely close to the water even when 50 to 75 feet up. It is apparent that many ditchings which were flubbed in the past were due, generally, to leveling-off too high. Any landing 30 to 50 feet in the air will ultimately prove somewhat rough whether over land or water.

We are fully aware that many readers will claim we're doing a lot of guessing in this article. We won't argue the point. However, it is our belief there exists within the air, a boundary layer close to the surface of the sea, where the velocity is considerably less than the air directly below and above.

The air below the unaffected area is constantly churning and changing because of the water action. Waves swell and roll. The air in turn, is forced in many directions. Molecular friction and compression may well enter the picture. It is an established fact that, if a layer of air is moving swiftly over another layer of air which is moving slowly, some of the molecules from the upper layer will move into the lower layer and increase in velocity. If any of the molecules wander from the lower to the upper layer, they will tend to reduce the velocity of the upper layer. It would appear then that there must be a narrow band where molecular interchange is at a minimum. In other words, a relatively thin, calm area of air movement. Depending on the size of the sea, the average height appears to be approximately 100 feet—the T-Effect area.

In winding up this article we'd like to reiterate our contention. T-Effect does exist. The photographs which accompany this article tell the story pretty well. If you ever experience engine failures of sufficient magnitude to preclude holding altitude, then, by all means, make a try for the T-Effect zone. END

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Phillip Dalton's Fabulous Computer

(Continued from page 44)

be worked with fewer manual steps by slightly altering the basic E6-B design.

Fig. 3 illustrates his model, designated the "Weems-Heitor Computer, Type E-10-A." Comparing this to Fig. 2, it will be noted that two complete compass roses are used and that the front of the slide contains a logarithmic curved slot and a slide rule with a pin engaging the slot. This reduces from five to two the manual steps required to solve the wind triangle and the time necessary to go a given distance. A comparison of the solution of the common problem, where the known factors are: wind velocity and direction, course to be flown, air speed, and distance to check point, illustrates the two methods. Information needed is drift, ground speed and time to check point.

Separate steps on the Dalton E6-B are: (1) Set the wind direction under the true index. (2) Draw or mark the wind vector length. (3) Set the course under the index. (4) Adjust the slide so the true air speed is under the tail of the wind arrow. (5) After the GS is read under the grommet, turn the computer

(Continued on page 60)

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(Continued from page 58)

over and set the GS on the slide rule opposite 60 to read time to check point.

On the new Heitor design, you: (1) Set course on the inner compass rose opposite wind direction on the outer rose, and (2) Adjust the slide so that wind velocity, on the printed scale, is over the TAS arc on the slide. With these two settings you can read drift under the wind velocity, groundspeed under the grommet, and time required on the slide rule opposite distance. (60 minutes on the slide rule is always automatically positioned at the distance reading identical to the ground speed under the grommet.) This new approach, although complicating the manufacture of the computer, greatly simplifies its use. For other computations of true air speed, altitude, etc., the regular circular slide rule is retained on the back side of the computer.

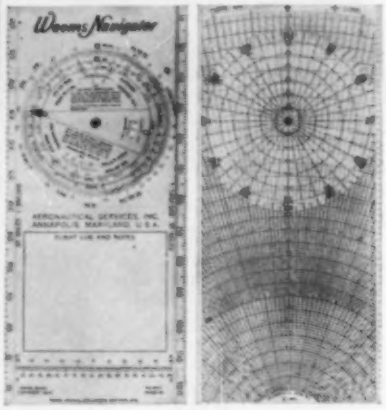

Fig. 4. The Weems Navigator, a new metal computer utilizing the basic E6-B principle.

To this major advance after many years, I found a companion development. While evaluating the Heitor Computer, I was requested to examine another model, simple to manufacture, yet providing a computer of such size and utility as to meet the need for a less expensive instrument for private and business pilots. It is not designed for the professional navigator who works in high speed, long-range aircraft but for the multitude of lightplane pilots. The novelty of this model, designated the "Weems Navigator," lies in the fact that the speed slide which was movable in all previous designs, is fixed; and the wind face, which contains circles of velocity and radials of direction, moves over the speed slide. (See Fig. 4) Only two settings are used on the wind side with time and distance solved on the reverse side as on other computers. With this design, the compass rose can be removed for use as a protractor and distance scales are included on the edges of the computer.

It would appear that the inventive genius of Philip Dalton has been reborn after many years and that the problems of both the professional navigators of the jet age and their more casual confreres will be somewhat simplified by these improvements.

END

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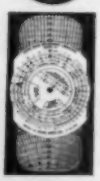

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I Learned About Flying from That!

(Continued from page 50)

for dinner. Take a whiff of Emergency Oxygen and spruce up."

I press on the Emergency valve and it jams after a slight movement. This is serious, but it does not upset me. I press the jammed lever hard, hold my oxygen mask tightly against my face, and breathe deeply. The cockpit lights brighten considerably, and I feel better.

I know that I should call Slingshot and Blue Two and descend immediately. I know, because I have been repeatedly warned about the initial effects of a diminished oxygen supply to the body. I have been in high altitude pressure chamber training programs, and am an experienced jet pilot. I have given many lectures on the first signs of Hypoxia, or lack of oxygen. I know them well: uncomfortable feeling, heavy breathing, tightness in the chest, narrowness of vision, apparent dimming of lights, a false sense of confidence, muddled thinking. I know all this, but it doesn't seem to apply to me at the moment. I rationalize all warnings, and wisecrack away the rest. By repeated gulping of what little oxygen I can get, I am confident I can finish the flight. "No sense in telling the others. You're okay now that you know what the trouble is. It might still be the pork chops."

We divide the flight and commence night intercept problems under Slingshot control. Slingshot's radio begins to fade. The controller confuses me with his sloppy instructions. He has to repeat a few of them and I miss one or two headings. Once I catch myself giving a call number I had used on an early morning flight. Things are not going well. I become irritated at the ship's controller and annoyed because the Banshee is wandering off course and altitude. For no reason at all, I start laughing at the silly way the sweep cuts across the radar scope.

"Blue One, this is Blue Two, are you all right? Check your oxygen." Sam's voice has an urgent tone.

Good old Sam, no worries when you have a wingman like him in the air. I'd better calm him down. I fumble for the microphone switch and transmit.

"Blue Two Sam, my oxygen is okay . . . this is Slingshot—I mean Blue One . . . the radio certainly is getting lousy . . . this is Blue One, oxygen Blue Two." I am annoyed at my stupidity. Then I laugh, the cockpit feels smaller, and I turn my instrument lights full on because the instruments are harder to see. I wonder why the rheostat knob feels like a switch.

"Slingshot, this is Blue Two. Blue One is having oxygen trouble. Give us a steer to home base.—Break.—Blue One, turn on your emergency oxygen. Go down man! Go down!"

The worried sound of Sam's voice seems funny and I laugh. "The joke is on him. He doesn't know I can't turn my emergency valve on. There's no sense in going down now that the hop is almost over. This is what you get flight pay for. It's just those pork chops . . ."

A thousand pins and needles begin to prick my right elbow. The signal runs

clear and true to my brain and cuts deeply into my fuzzy complacency. I get this message and react immediately. I push the plane into a steep dive, open my speed brakes, and suck oxygen as deeply as I can. The lights clear again and I look at my cabin altimeter. It is difficult to see at night but it tells me the story at a glance. The hand is just passing 30,000 feet. I have been operating at a critical altitude, with no cabin pressure, and with improperly operating oxygen equipment! It was the pain of the "bends," caused by expansion of the nitrogen gas in my joints, that snapped me out of my stupor.

I call Blue Two and tell him that I am having oxygen trouble and am descending rapidly. This is no news to him.

A check of my flight instruments sends a cold chill through me. The main flight instruments are inoperative and tumbled. I ease the dive and look about the cockpit. My generator switch is in the *off* position. I had cut off my own instrument power! The night is black, and the instruments are a critical item. I correct my error and search for more problems. A hissing sound about my head leads me to check the canopy seal. There is the answer! I had been distracted by the hung wheel after take-off and failed to close the canopy tightly. It was opened just a crack, but it was enough to let the cabin pressure bleed out. In the gradual climb to 15,000, and then to 33,000, I did not notice the change in pressure. I failed to check my cabin altimeter. Add that to oxygen trouble, and the answer was almost disaster. I growl at myself as I continue descent and recheck everything in the cockpit. I am in full control of my senses by 10,000 feet, but take no chances and work on the oxygen constantly. I report to Slingshot.

"Blue One, this is Blue Two, are you okay now?"

"I'm okay for real this time, Blue Two. Let's go home."

"Roger! You had me shook for a few minutes there, pal."

We break through the cloud layer and head for the beckoning red lights of the Task Group. I check, recheck, and check again every move. Altimeter, heading, airspeed, wheels, hook, flaps—nothing less than 100 per cent concentration on this night pass—the comforting voice of the Landing Signal Officer—the lights of the carrier—one signal from the paddles—the flashing second of the final approach, cut, and landing—the delightful, spine-crunching jolt as the tail hook catches an arresting wire, and the Banshee lands once again.

I climb from the cockpit, well shaken from the night's adventures, and grope my way through the darkened ship to the Ready Room. There is a large crack in my armor of perfection, and my squadron mates dig their friendly jibes deeply. I take it all with a numb grin. No excuses tonight. The landing Signal Officer meets me with a smile and congratulates me for a fine pass and landing.

I laugh at the irony of the situation and loosen up. The show was rotten, but the curtain was great! END

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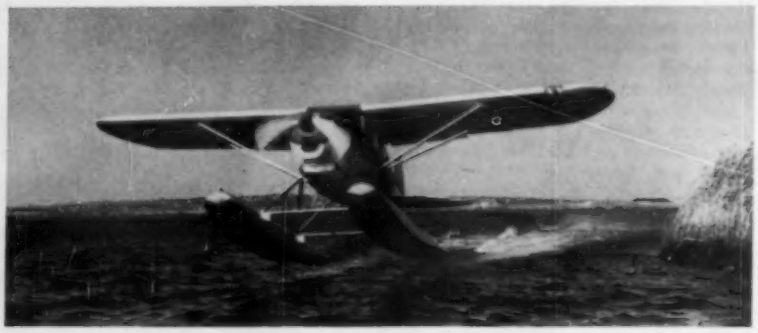

TRI-PACER 160 ON FLOATS

SEAPLANE version of the Tri-Pacer 160, shown above and on the cover, comes equipped with Edo Model 89-2000 floats. Although identical to the landplane, it is one-and-a-half feet longer due to the forward protrusion of floats. Specifications below show other differences:

Gross weight	1,950 lbs.
Empty weight	1,290 lbs.
Top speed	117 mph
Cruising speed	107 mph
Stalling speed	58 mph
Service ceiling	15,300 feet
Cruising range	430 miles

Tri-Pacer 160

(Continued from page 43)

Fuel consumption is nine gph at that power setting, giving the 160 a range of 536 miles on full wing tanks or 655 miles by use of the optional tank.

The 160 has a design service ceiling of 16,500 feet and an absolute of 19,000. Such specs should be good news for pilots who operate from high altitude fields in this country and South America. Another feature I like is the uncomplicated landing procedure. After flying the usual pattern and turning on base leg, the airplane is slowed to 95 mph or less and flaps are lowered all the way. Then the plane is trimmed for a 75-80 mph glide and this is held over the fence, when airspeed is further reduced for the flare-out and touchdown in a standard three-point attitude.

To shorten the landing run, the controls may be held back far enough to keep the nosewheel off the ground. In this nose-high attitude maximum wing drag is produced. As the airplane slows, the nosewheel is lowered to the runway and brakes applied as necessary. Landing roll is about 500 to 600 feet.

In summary of the Tri-Pacer 160, I conclude Piper has combined the best features from this line of time-tested aircraft and added refinements. The power increase is the outstanding feature of the 1958 model, but the additional features such as cargo utility, control techniques and cabin comfort will not be lost on the pilot who appreciates a good aircraft. END

TRI-PACER 160 LANDPLANE

Manufacturer's Specifications

Span	29.3 ft.
Length	20.6 ft.
Height	8 ft. 4 in.
Gross weight	2,000 lbs.
Weight empty	1,110 lbs.
Fuel capacity (standard)	36 gals.
Top speed	141 mph
Cruising speed (75% power at sea-level)	125 mph
Stalling speed (with flaps extended)	49 mph
Cruising range	500 miles
Service ceiling	16,500 ft.
Engine	Lycoming O-320B
HP and RPM	160 at 2,700

Making of a Blimp Pilot

(Continued from page 40)

switch was made to qualified naval aviators, this time was reduced to 17 weeks.

Trainees reporting to Glynco get two weeks of ground schooling before even getting inside a blimp. They are first indoctrinated in the construction and design of airships, their fuel systems, control mechanisms and kindred physical properties. Then the actual flying begins. Alternate days are in the air and in ground school. Studies concern electronics, aerodynamics and navigation. The latter is critical to an LTA pilot because there are great drift angles in blimp pilotage and vital need for pinpoint accuracy. Another important subject to LTA pilots is that of aerostatics—the contemplation of gravitation and the way it affects a body suspended freely in the atmosphere. Along with this, there has to be thorough analysis of the earth's atmosphere.

Aerostatics can become quite involved, and the students have heavy brainwork to figure the properties of gases. It's necessary, however, because it's those gases and the way they act that keep the pilots in the air. One of the most important properties of gases is that of superheat. When gas expands, it becomes lighter per unit of volume. Thus, for example, when a blimp is heated by the sun, its superheat must be taken into consideration because the heat increases the lift.

Until recently, prospective pilots were introduced to aerostatics by flights in a free balloon. This, many claim, was the most fascinating phase of training. A free balloon is just what its name implies, a large helium-filled bag with a basket for a crew suspended under it. It has no power. The occupants can basically make it go only up or down. Winds, thermal currents and other elements of the atmosphere govern its other movements. To make it rise, handfuls of sand are thrown overboard; to lower it, helium is valved. With the Okefenokee Swamp on one side of Glynco, and the Atlantic on the other, it's easy to see how anecdotes of free balloons at Glynco could fill a book.

But free ballooning wasn't just for fun and adventure. It's important that every pilot understand and respect the power of the wind and realize that a blimp without power is literally a free balloon and must be handled as such. As valuable as this training was to prospective LTA'ers, there was one drawback. It was expensive. Every time a free balloon flight was made, about $700 worth of helium was expended. When the flight was over, the only way to get the balloon back to the ground was by valving helium. Thus it was a total loss. This expense, plus the fact that helium is not overabundant in America, caused the Navy to abandon its free balloon phase of LTA training.

The blimps used in training are the 3K type, 265 feet long, 82 feet high, 62 feet in beam, and distinguished by four tail fins, as opposed to three on the newer models. The 3K normally operates with a nine-man crew, and differs from later models in that it requires two pilots to fly it: one at the elevator and the other at the rudder controls. These ships are quite different from those used operationally. Fleet squadrons operate more modern models.

The 5K's operate with a ten-man crew, and can be flown by a single pilot. They're outfitted to make extended patrols and have special equipment to permit refueling from a surface craft. Their cabins are loaded with electronics gear.

In a blimp there is no structural metal except in the rudder and elevators. The non-flammable helium keeps the envelope filled, and it doesn't take much pressure to do it. In fact, a regulation football takes 180 times the pressure required to keep a blimp's shape. Stiffeners, in the form of aluminum battens, are used around the ship's nose, so that the bow will not be distorted when the ship heads into an especially strong wind.

In an airplane, trim is maintained by tabs on the control surfaces. In a blimp, this is done by ordinary air ballonets, which in effect, are balloons within a balloon. These ballonets within the envelope contain outside air. By controlling their size with valves, the helium can be shifted. Also, as altitude is increased, the helium expands, so the ballonets decrease in size by forcing out their air. To get air back in, either slipstream air or a

(Continued on page 66)

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(Continued from page 65)

blower is used. Probably the most difficult adjustment for regular pilots is the slow tempo of the ship in reacting to controls, and the pace of landings, which can't be made faster than 23 mph—a snail's crawl to a hot jet jockey. High skill and precision teamwork, both on the part of the pilot and the ground crew, is required to get a blimp safely secure on the ground.

Like a conventional aircraft, a blimp lands into the wind. As it approaches, the ground crew composed of 40 to 60 men (known among themselves as "mat rats") fans out across the concrete landing area. Theirs is a hand-blistering, muscle-straining, exacting job. The ground handling officer takes his place in the center of the field and directs the airship commander in landing and in taking off.

Two lines hang loose from the nose of the blimp. As it nears the ground, four handlers race forward and grab these lines as the pilot reverses engines to slow his speed. Two other "mat rats" run to the side of the ship and unhook longer lines fastened there. The rest of the ground crew then seize these lines. All this is done while racing at break-neck speed to keep up with the blimp before it is finally pulled to a halt. If the pilot has made his approach too fast and there's danger of not being able to stop the ship, the GHO signals the handlers to turn loose the lines and gives the pilot a "wave-off."

A blimp coming in too fast can be a dangerous thing to ground handlers. There's just enough room, for example, between the ground and the whirling blades of the twin engines for a man to lie flat on his face. Every handler is taught to hit the deck in a prone position if he sees those blades coming at him. A sudden gust of wind, too, can play havoc during landing.

Once a ship is under control on the ground it is ready to be hooked to the landing mast. This is a delicate maneuver which requires a skillful pilot, a keen-eyed ground officer and a talented handler to make the connection at the top of the mast which, incidentally, is self-propelled and may be driven into position. A steel cable from the blimp's nose is threaded into the top of the mast and the airship slowly maneuvered forward until the fitting on its nose hits the socket of the mast. It is then locked into place and the blimp is secure. It can now be maneuvered into the hangar.

Prospective blimp pilots are also indoctrinated in anti-submarine warfare, including attack with dummy depth charges, and certain other techniques.

Blimp flight is smooth, silent and slow, with some qualifications. It's smooth over water, but gets a little rough over land with its thermal currents. It's silent, but only in comparison with the din of conventional planes. (It's still almost impossible to carry on a conversation except over the blimp's inter-com.) And it's slow, but only as far as speeds in the air are concerned, averaging about 45 knots.

After his weeks of intensive study and flying, the successful student receives his LA designation and goes to a fleet squadron to put his knowledge to work.—END

Blimp on Radar Guard

(Continued from page 41)

craft maintain continuous all-weather patrol on station for sustained operating periods?

Heretofore, lighter-than-air had been fair game for scoffers. Fair weather toys, said they, useless in high winds, icing conditions and turbulence. The going, for lighter-than-air, could get very rough indeed, should phase three prove the scoffers correct. Failure would mean an unfavorable report, reduction in force, cuts in budget and, worst of all, inability to hold up LTA's part in the defense program.

What program? The "big" program, the real reason LTA must be able to patrol in all kinds of weather: the radar early warning defense of the United States. Officers of LTA had made a bold pitch. They had said blimps could be rigged to carry early-warning gear and could extend the radar detection perimeter far to sea. With their slow speed, low-altitude cruising and long endurance, nonrigids could cover blanks in the radar envelope between the Texas Towers and the high-flying early warning airplanes. They could link the line outposts and the land stations, plugging gaps which might otherwise let low-flying enemy bombers through.

Even the scoffers had to admit that the potential was there. No airplane could remain aloft, without refueling, as long as a blimp, nor as economically. A ZPG-2 type could lift as much radar and communications gear as any airborne station would need and had space for ample personnel to man it around the clock. Everything hinged on whether or not blimps could take weather.

"You'll never make it," said the doubters. "Remember the Shenandoah? The Akron? The Macon?"

Unlike those ill-fated rigid airships of yesterday, a ZPG type blimp is a fat, flexible cigar-butt of gas-tight fabric 342 feet long, 96 feet high, and 77-odd feet in diameter. Inside its envelope is 1,000,000 cubic feet of space. Below it is a car containing crew, engines, and working gear. The engines are inside the car and can be repaired one at a time in flight. Meanwhile, helium holds it aloft.

The big bag is not all filled with gas. Much of its volume is taken up by air under slight pressure. This air can be controlled to trim the airship by displacing helium fore or aft, to move the center of buoyancy as required. The displacement is accomplished by adjustable fabric chambers called ballonets. Air forced into a forward ballonet squishes the helium above the ballonet fabric aft. Reversing the process moves the lifting gas forward.

With enough helium aboard to make the ship lighter-than-air, it can be operated as a true balloon. Usually, however, lighter-than-air is in its strict sense incorrect, for customarily the airship is rigged slightly heavier-than-air for cruising. Altitude is maintained by forward motion supplied by the engines, causing the airfoil section of the bag shape to furnish lift, as does an airplane wing. The airmanship of LTA flight consists

(Continued on page 68)

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An oldtime executive pilot was overwhelmed by the flight ops room and related etceteras and just frankly couldn't believe it all.

"It's great," he said. "But where's the catch — what'll it cost me to use all this?"

He nearly split his leathery face wide-open grinning when told, "Nothing — nothing at all, podner."

When the manager of the second floor Flight Deck Restaurant first saw the night-time view out his great panoramic window, he sat down almost reverently and said, "Where've I been all my life? What a place to eat!"

The top VP of a firm making new business planes cancelled an appointment, spent an hour taking it all in, then observed:

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BUSINESS BRANDS

WHEREVER there is new equipment to inspect or entertainment acts to preview for his three restaurant-supper clubs—two in Scranton and one in Wilkes Barre—it is second nature for George Colovos, president of Europa Restaurant Corp. of Scranton, Pa., along with George Carros company treasurer (left), to use the company plane for transportation.

Mr. Colovos (right) was with the Air Transport Command for three and one-half years. A pilot since 1939, he is Europa's company pilot as well as its president. The Tri-Pacer he flies is the fifth his company has owned. This is soon to be replaced with a new all-metal low-wing Piper Comanche.

The restaurants, all known as Twin Grill Europa Lounge, cater to some 5,000 persons daily. Entertainment is a feature at all three and Mr. Colovos believes he holds a decided edge in the selection of talent by his ability to fly around and "see for myself" before bookings.

(Continued from page 67)

of skillfully manipulating the delicate balance between the heavier and the lighter-than-air conditions of the blimp, while navigating it.

Chief manipulator within the control car is the command pilot. Modern airships have dual yoke controls for pilot and co-pilot, with throttle pedestal and console between. Greatest boon to the LTA flier is the blimp autopilot, now perfected after many years of effort. The command pilot normally takes the left seat for landings and take-offs, turns the ship over to pilot and co-pilot for cruise. In every blimp crew rides a mechanic to service the engines, a rigger to care for the envelope and car, and a cook. In the radar-carrying ZPG-2W's, six additional crewmen, directed by a C.I.C. officer, operate the electronic equipment. Two complete crews go along on long patrols. With the command pilot in charge, and the cook feeding both crews, the total complement adds up to 24 souls, a respectable equipage for any airborne craft under way at 50 knots. Full power will up the I.A.S. to 70 knots. On patrol station, steerageway can be maintained at 10 to 15 knots with ease. Stationary balancing is done by matching headwinds.

Cdr. Ron Hoel, C. O. of the Naval Air Development Unit at South Weymouth, though a heavier-than-air pilot, and Cdr. Larry Mack, Skipper of Lakehurst's Airship Early Warning Squadron One, had seen the silver bags through the rugged ground handling and icing tests. It seemed a good bet that their aerial elephants would perform as advertised. Hoel knew that Capt. Eugene Tatum, Navy liaison officer for Project Lincoln, would keep a close watch on the performance. Lincoln was a big stadium in the air league. If LTA made this team, they would be off the bench and into the game with the varsity.

While Hoel and Mack knew the airships could take a beating and survive, what they didn't know was that, during the ten days selected for the continuous radar-watch test, the area, the routes to and from it, and the take-off and landing sites would be gripped by the worst winter weather seen on the East Coast in 35 years. The test-planners had chosen a lulu of a proving ground—a patch of North Atlantic 200 and more miles off the New England coast. The test period was from 15-25 January—mid-winter. Airships based at South Weymouth and Lakehurst were to alternate in relief of each other on station. The patrol period of each was scheduled as 24 hours on station, plus to-and-fro en route time.

What did the wallowing "bloopy-bags" do to make history? Listen: The assigned patrol area was continuously covered, as scheduled for ten solid days. Winds at

take-off and landing sites reached 60 mph during the test period, yet there were no gaps in the continuous coverage.

A NADU airship, skippered by Cdr. Jack Hunt, once flew 40 hours, at altitudes from 200 to 3,000 feet. Icing conditions were encountered during 32 of the 40 hours. Hunt's patrol was begun and completed on schedule.

A new endurance record for the ZPG-2W was set by a crew under Lt. Cdr. Ernest Babb. Babb's blimp completed her own patrol and was properly relieved on station. Starting for Lakehurst, Babb was advised of deteriorating weather there and diverted to South Weymouth. Fighting through headwinds and clouds, the tired crew landed at South Weymouth 56.3 hours after take-off. Ironically, South Weymouth weather on arrival was at least as bad as that at Lakehurst.

Record performances are not achieved without anxious moments. Pilots and crews returning to base knew they would be up for patrol again after an all too short rest. In half-way decent weather, the return trip from a mission affords a relaxing stretch in which to let down a bit from the strain of patrol. But Commander Hunt's ship, returning in dismal weather conditions, nuzzled up to her mooring mast only to find the securing lugs—recessed plungers made to hold the ship's nose fast, yet permit her to pivot into the wind—had frozen. Crew members had to remain on board and keep their ship steady on the deck in gusty winds. Hardy LTA sailors climbed the mast and "unfroze" the lugs with sledge hammers. Working unprotected in icy blasts atop the 50-foot mast, the landing party fitted the ship's nose cone into its securing cup and drove home the freed lugs. Not until almost two hours after touchdown could the ship be reported secure.

While Hunt's ship was securing, another ZPG-2 had been standing by to take off. By the time all was clear for her to unmoor, she had been stationary outside the hangar in the snow for eight hours. When an airplane accumulates fallen snow on its outer surfaces, the ground crew sweeps it off before take-off, thus assuring smooth airflow and no excess load. But how would you sweep snow off a round, flexing bulky mass over 90 feet high in the dark?

There could be no waiting. ETD was already past. Three inches of snow stood on the airfield. How much was on the bag? Whatever the answer, there was no alternative but to try a take-off. Straining for maximum lift, the craft freed her nose from the mast. Immediately the tail began to sink, dangerously fast, toward the frozen tarmac. With yoke, throttles, and ballonet air controls, the command pilot fought gravity with all his skill. Helium was forced aft to shift the center of buoyancy nearer the tail. Full down elevator used what airflow could be coaxed over the control surfaces to check the downward sink and raise the aft end of the ship. In spite of all efforts, there came the sickening sound of airship striking earth. Rebounding, however, like a limp football, the ZPG bounced into the air—and stayed there! Snow blanket and all, she lumbered on through the murk to take up her patrol station on time.

During the test, individual outstanding performances became routine, but it cannot be denied that Lt. Cdr. Dale Richardson's GCA landing merits mention. As Richardson completed his approach, the aerology teletype was clicking out Lakehurst's official present weather: Ceiling —200 feet. Visibility—$\frac{3}{16}$ of a mile. And immediately following Richardson's landing, Commander Hunt took off in almost the same weather conditions.

When the last ZPG touched down on the morning of January 25, 1957, the test area had been kept continuously covered, solely by LTA early warning radar, for 240 successive hours.

During the time the airships were maintaining their patrol, from the 14th to the 16th of January 1957, commercial airliners from Maine to Florida were grounded by "impossible" weather! On or about the 16th of January, military "all-weather" aircraft were grounded. Weather during the ten-day test period ran the gamut of snow, ice, sleet, freezing rain, thunderstorms, high surface winds. Calm areas were locked in by zero-zero fog and mist.

Even the scoffers had to admit the blimps had cut the mustard. No more could the epithet, "fair weather fliers," be applied to the silver elephants. From here on in, lightly and politely, they would take their place in the first division of the big patrol. END

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Flying Tigers' Grandpa

(Continued from page 35)

cloak and dagger atmosphere. The six dismantled, crated planes were accompanied to San Francisco by the pilot and Mrs. Wilcox. There the boxes were turned over to Sun Yat-sen's followers. Re-crated and labelled "Printing Equipment," the cargo was shipped to a friendly Chinese newspaper. Meanwhile, the "honeymooning" Wilcox couple boarded another Pacific liner headed the same way. They were accompanied by two Nationalist interpreter-chaperons, Ee Kwi and Lue Fai, furnished by Sun Yat-sen to insure safe arrival of Wilcox, who was to act as flight instructor for the yet-to-be-chosen Chinese flying cadets.

Shortly before the Wilcox-Chockman negotiations, Oct. 10, 1911, the Chinese Nationalist rebellion, officially known to historians as the Wuchang Uprising, had exploded under the centuries-old Manchu dynasty. Sun Yat-sen, who'd planned to sail from California, was denied a passport visa by the U. S. State Department, an official slight which, even in more modern times, the Truman-Acheson administration did nothing to atone for its failure to provide the present Nationalist commander, Chiang Kai-shek, with military arms the U. S. Congress had voted to send. Sun Yat-sen finally sailed for home from a Carolina port to Europe; and then proceeded to China.

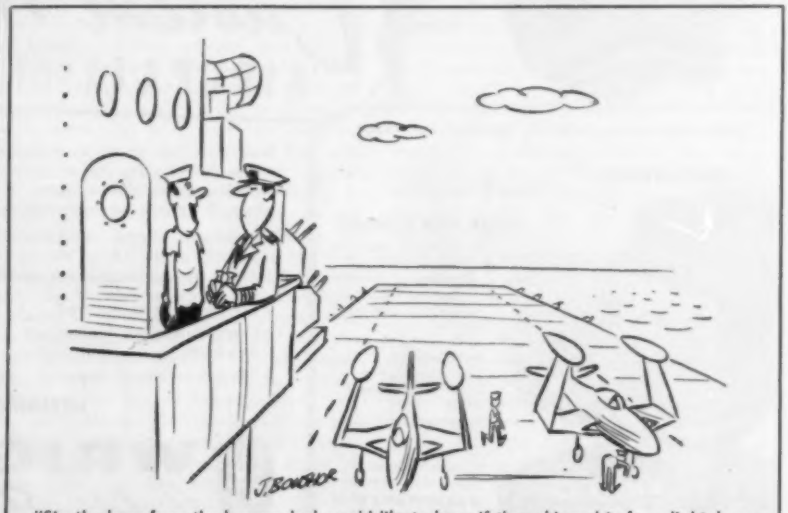
Conveniently for Wilcox, the Emperor Suan-t'ung decided he'd had enough and quietly eased out the Imperial Palace side door on Dec. 28, 1911. This bowing out of the last of the Manchus who'd ruled China since 1644 was what the rebellion had sought to secure. Wilcox didn't dock until Dec. 31, a full 24 hours after the announcement of Suan-t'ung's action had been made public. The unscheduled timing of events removed the lanky Michigan man from any possibility of prosecution for filibustering.

Several years before in London, a missionary friend had utilized English newspaper publicity and a writ of habeas corpus to pry the illegally-seized Sun Yat-sen free from the Manchu embassy. The Emperor's agents had kidnapped Sun Yat-sen on a London street and were preparing to ship him home for trial and execution. The publicity following the missionary's prompt action had saved the life of the student revolutionary. Thoroughly aware of the value of publicity of this and other incidents, Sun Yat-sen started the homeland propaganda mills rolling promptly upon completion of negotiations with the Detroit plane builder and pilot. Wilcox still chuckles over the blast of "flying dragon" stories which flooded friendly Chinese newspapers preceding his arrival. These fanciful yarns gave the incoming Wilcox and his airplanes a build-up worthy of a General LeMay and a squadron of B-58's loaded with H-bombs. Hysterical fear of these awesome planes, Sun Yat-sen repeatedly told Wilcox later, aided mightily in the success of the revolution.

Meanwhile, on arrival in China, Wilcox and his wife proceeded to Nanking where the Nationalists had levelled a mile-square area near the city as the site of China's first airport. Forty flying cadets had been selected for instruction at the air field, the outer perimeter of which was closely guarded by armed Nationalist sentries.

Wilcox, one of history's earliest mass student instructors, assembled one of the planes as a trainer and mounted on it the 50 hp engine, complete with governor. The precaution of the gasoline governor saved Wilcox from having to assemble any of the other planes. Traveling diagonally across the mile-square area, the fledgling pilots could get up speed enough only to pull the plane a few feet in the air. He and the students fitted a machine gun mount on this plane but never used it aloft.

However, the students had plenty of gunnery practice on the ground, firing a pair of Austrian water-cooled machine guns. Five hours' flying instruction was



"Sir, the boys from the hangar deck would like to know if they chipped in for a lightplane, could they have a flying club?"

considered sufficient to turn out a finished pilot.

Wilcox spent February, March and April of 1912 teaching the 40 cadets to handle the "flying dragon" trainer. The other five planes were not uncrated while he was there.

He has two yellowing old photos from those days. One is a shot of the tricycle landing gear trainer and an unidentified Chinese student at the controls. The other is a photo of 21 class members—China's first pilots—with the angular Wilcox in the back row. His only instructor's insigne was one of those shapeless old civilian caps popular in the States early in the century.

Wilcox believes the activity at Nanking, training cadets, which continued even though Emperor Suan-t'ung's official abdication was announced Feb. 7, 1912, to impress any refractory war lords with the futility of opposing a movement which the ousted Manchu forces had been unable to quell. After completing his contract at Nanking, Wilcox had numerous long chats with Sun Yat-sen, whose brother-in-law, Chiang Kai-shek, is present Nationalist head of free China.

Wilcox affirms his faith in the Nationalists, flatly declaring:

"When a country's still as close to the ideals and aspirations of what the Nationalists did and do stand for, the comparatively traitorous few now in power on the mainland will have to face a 'judgment of the people' themselves one of these days."

Heading home from the China jaunt, Mrs. Wilcox recalls stacks of collapsible cloth lifeboats piled high on Hong Kong docks, a sign of quickening interest in sea safety following the sinking of the luxury liner *Titanic* only a couple of weeks previously off Newfoundland. July 4th, Wilcox recalls, was spent on the Red Sea prior to a London visit and then back to the U. S. where the construction business absorbed his energies thereafter for many years. The old China hand denies that he has ever lost his early interest in aviation, even though his greater opportunity lay in another field. And perhaps it is enough for one man that he introduced the air age to ancient Cathay.

A few weeks before the Wilcoxes celebrated their golden wedding anniversary in November 1955, Dom Jalbert, Florida aerological engineer who developed the current Byrd Antarctic "Sky Hook," 1500-foot radio aerial balloons, invited the couple for a ride in a modern business plane. They promptly accepted. Mrs. Wilcox, though she'd frequently helped her husband repair his planes in the "cow pasture" days, had never been aloft, nor had Wilcox flown since he'd left Nanking in 1912.

When the trio arrived at a nearby airport, the tiny, bright-eyed Mrs. Wilcox bounced out of the car onto the runway and made a bee-line for the small ship. Reaching up to feel the wing fabric tension, she turned to ask knowingly, "Young man, how often do you have to dope these things nowadays?"

And her husband said, "What I'm wondering is when 'A' power will propel them?" END

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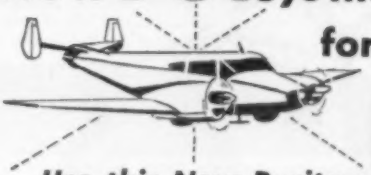

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AOPA NEWS

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Headquarters address is Box 5960, Washington 14, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

AOPA MEMBERSHIP GAINS

Membership in the Aircraft Owners and Pilots Association continued its almost uninterrupted 19-year climb when approximately 5,000 additional members were enrolled during 1957. On Dec. 31, AOPA's membership total was 68,439, compared to approximately 63,500 on the corresponding date of 1956.

During 1957, a total of 16,384 new members were added to the rolls. There were 52,055 renewals.

If the rate of increase experienced in the past continues until AOPA celebrates its 19th anniversary next May, the organization will have doubled its membership within nine years. When its 10th birthday was observed in May, 1949, AOPA had a total of 35,000 aircraft owners and pilots on its rolls.

NEW STAFF MEMBER

Sue Timberlake of Washington, D. C., private pilot and magazine editor, has joined the AOPA staff. J. B. Hartranft, Jr., AOPA president, announced that Miss Timberlake will be associate editor of AOPA's new official magazine, the AOPA PILOT, which will make its appearance monthly beginning March 1.

Sue Timberlake, associate editor of AOPA's new monthly magazine, The AOPA PILOT.

Before joining the AOPA staff, Miss Timberlake was editor of the National Business Woman, monthly magazine of the National Federation of Business and Professional Women's Clubs. Prior to that connection, she was assistant editor of publications of the National Planning Association, a nonprofit organization of agricultural, labor and business leaders considering national problems.

The PILOT associate editor's journalistic experience started as editor of her high school newspaper in Minneapolis, Minn. After graduating from Smith College, Northampton, Mass., where she majored in government and Russian area studies, Miss Timberlake did graduate work in international relations at the University of Minnesota and American University of Washington, D. C. After spending a year abroad, she did research and translating work for the Federal Government.

Her aviation career started about a year ago. She received flying instructions at the Falls Church, Va., Air Park from Jack Whyte (AOPA 125906) and made her solo flight in an Aeronca *Champion*. Whyte, incidentally, first got her interested in AOPA.

Miss Timberlake says she looks forward to her work on the new AOPA magazine since it will permit her to spend full time in her chosen field of aviation.

SHARP INCREASE

Travel to Latin American and Caribbean points by lightplane may set an all-time high this year, according to the AOPA Flight and Travel department, which bases its prediction upon the requests for flight assistance received from AOPA members early in the season.

During the month of December requests for aid in preparing for trips to that area were 62% above those handled by the AOPA department in December, 1956, which also was a good month for travel below the Rio Grande and to the Caribbean. Assistance was given in the preparation of 131 flights to the two areas during December. The year before the monthly total was 81.

Sharpest increase was noted in travel to the Bahamas, Puerto Rico and Cuba, although there was a 50% gain in AOPA-assisted flights to nearby Mexico and South America.

Another straw in the wind regarding long distance flights, was the demand for aeronautical charts filled by the AOPA Chart department during the same month. A total of 3,881 Sectional and World Air charts went to AOPA members, who subscribe to the chart service, during last December. In the corresponding month of the preceding year the total was 2,509.

GATE ACCOMMODATIONS

When you want to use air taxi service from any Southern California point to make an airline connection at Los Angeles International Airport, Gate 34 at the terminal will be available to help you save time. No longer will your air taxi be required to land at some remote corner of the airport which will require shuttle service to get passengers to the terminal building.

AOPA's Airport consultant, Cy Thompson, is receiving letters of appreciation from California air taxi operators for a successful assist in their efforts to obtain terminal gate positions for the unloading or pick-up of airline patrons.

Action by the Los Angeles Department of Airports in making the first loading gate assignment followed an AOPA showing of the urgency of main terminal loading accommodations for air taxi operators who provide speedy air service for travelers between the 554 airline stops and more than 6,000 airports having no airline service. Thompson believes that similar gate accommodations ultimately will be provided at all terminal-type airports in order to accommodate airline patrons arriving in private or business aircraft.

In its correspondence with the Los Angeles Airport management, AOPA stressed the urgency of better service for busy persons in commerce and industry who supplement airline service with private corporation-owned and taxi aircraft. He pointed out that convenient land taxi and rental car service always was available at such airports, but that airline passengers who wish to continue their trips to a non-airline airport by air are placed at great inconvenience to do so.

PLANNING A TRIP

AOPA recently was able to assist one of its new members, Juan A. Orfila (AOPA 154942) of Mendoza, Argentina, get his Cessna 172, which he had purchased in the United States, back to Argentina.

The AOPA Flight and Travel department, in cooperation with the Service department, helped Orfila arrange for flight and instrument instruction, get the necessary papers for his airplane and the documents required for his flight back to South America. The AOPA Confidential Newsletter located a co-pilot to help the AOPA'er fly the 172 to Mendoza. Dozens of American pilots answered the notice appearing in the Newsletter, and Orfila selected James Lanning (AOPA 111367), Silver Spring, Md., flight instructor. The flight was completed in eight days. Laning reported it was a "very easy trip."

From Kansas to Cosmos

(Continued from page 25)

missiles are flight-tested. At strategic points along the range are instrumentation stations, with equipment for measuring, recording, and evaluating the performance characteristics of space-piercing missiles, components, and vehicles for new weapons systems.

Before any of the long-range missile flights were begun, it was necessary to do some pioneer flight surveying along the old Spanish Main. Instrumentation sites had to be determined, undersea cables laid, island distances meticulously measured and many other details coordinated. Happily, we had a vehicle to fill the survey bill—the sturdy Albatross, SA-16A-GR, which means search amphibian, type 16, first model in the series, built by Grumman. Sixteen souls can be comfortably accommodated and bulky freight carried. Jet assist take-off units can be quickly installed on the hull doors. Quick-feathering reversible-pitch propellers are a godsend. The amphib carries enough fuel in internal drop, and float tanks for 16 hours of flight and good radar, simple to operate, assists in navigation.

What really counts, however, is performance. Original specifications stated that the plane should be capable of landing in ocean swells three feet high. Proof of the design came when Capt. Norman Long landed in the Atlantic with a full load of fuel to rescue two men sighted adrift in a small rowboat in a shark-infested sea whipped into 14-foot swells by a "nor'easter." Landing, rescue, and subsequent take-off were without incident.

Nassau, on New Providence Island, was chosen to be our base of operations for the survey of the Bahamas. Several reasons dictated such a plan. Flying from Florida each day would add hours of air time which is more costly than hotel rooms for five airmen. We would be able to contact veteran pilots of Bahamas Airways for detailed information on landing spots in the "out" islands. And most important, we would be nearer our survey parties on the various spits of land in case of accident or threat by hurricane.

We set up at the Carlton House Hotel in downtown Nassau. Miss Bess Amoury, manager of the hotel, generously lowered the tourist rates to those nearer an airman's pocketbook.

Oakes International Airport is a scant few blocks from the center of the Bahamian capital. The Albatross soon became a familiar sight on the flight ramp. At the end of each day's flying, our Sergeants could be found washing the dried salt water and sea spray from the amphib. Actually, we never could determine which was more corrosive—the airport well water or the dried sea water. Captain Morin and I took care of the customs, clearance papers, flight records and reports. After refueling the airplane we would all pile into my car and head for Miss Amoury's Carlton House. Over the dinner table we would plan the next day's operation.

Flights from Nassau carried us to San Juan, Puerto Rico; Ciudad Trujillo, Dominican Republic; Port-au-Prince or Port-au-Paix, Haiti; Camaguey, Cuba; and to all of the major islands in the Bahamas. On the shorter survey flights, we would depart Nassau to deliver men, groceries and equipment to one of the islands on which the U. S. Army Engineers were busy building an airbase. The large majority of the flights were to such unlikely places as Stirrup Cay, Samana Cay or Highborne Cay among the smaller sand spits.

Navigation is easy in the Caribbean, for in clear weather one is able to see from island to island even flying at low altitude. Once over an island where we desired to spot a survey party, we would circle and examine the surrounding sea. The water is so clear that it is impossible to determine its depth from the air. Sergeant Martin solved that problem. He fashioned short wooden blocks, painted yellow and tied with six feet of rope to a rock. The Albatross draws about five feet of water when loaded. We would fly over an area we considered safe for a water landing and Martin would drop the depth markers from the rear hatch. On the next circle of the proposed landing area we would observe whether any of the markers were floating. If not, the next step was to evaluate the surface of the water.

Some of the islands have small bays or inlets where we could establish a "seadrome." Where an off-shore landing had to be made, our "in-the-air" evaluation of the surface conditions had to be very ac-

(Continued from page 74)

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(Continued from page 73)

curate. Most pilots are taught to land into the wind. When flying an amphibian to a landing on the open ocean, sometimes it is best not to land into the wind but parallel to the swells. Wind causes swell action on the water surface. It is possible to estimate the force of a swell system very accurately from the air. We would drop smoke float markers and time ten swells past the smoking target. A simple formula is applied, in which velocity of the swell equals three times the swell period. Then the length of the swell is five times the period squared. With this we could determine from previously prepared charts whether or not it was feasible to make an open sea landing. Most of our water landings, in both sheltered and open waters, were at maximum gross weight allowed by the USAF Technical Orders.

A water landing in the Albatross is easy even in rough water. It is desirable to have the plane touch the water in a nose-high attitude. A normal approach is made with full flaps down. Four or five feet above the water, a nose-high, slow-flying attitude is established, until the desired landing spot appears. To keep the amphib on the water, reverse thrust is applied vigorously. The most desirable thing in the world to an amphib pilot attempting an open sea operation is to get in the water in the best area and to stop as quickly as possible. The reverse propeller pitch allows quick stopping.

The pilot's head is only about three feet above the water line while taxiing the Albatross. Once we were in the water, Sergeant Mills was an indispensable member of the aircrew. He would go to the forward hatch and direct taxiing through shallow waters using the interphone system. Occasionally, we were able to taxi near the beach of a small island if it was unobstructed by coral reefs. Near the shore either the anchor was thrown overboard or the landing gear lowered to down position. Using the gear and the reversing feature of the propellers, we would slowly back into the pink sand beach. This simplified vastly our unloading operation as many of the sand spits are uninhabited, and ground assistance was not available. Where available, we utilized the services of native boatmen. The Bahamians are great sailors. They take tiny sailing craft across many miles of open water. Often we were met immediately upon landing by Bahamian boatmen who would leave the beach during our overhead evaluation of the water. Since the Albatross isn't exactly the quietest flying machine in the world, they probably heard us coming long before we came into sight.

Sometimes the crew and I went exploring while our survey party was about its evaluation business. At San Salvador, we inspected the beach where Christopher Columbus is reported to have made his historic landing in the New World on Oct. 12, 1492. Near that spot, U. S. Army Engineers have dredged several old Spanish cannons from the surf. It was a strange sensation to realize that a boy from Kansas was about the chores of preparing for human exploration of an environment beyond anything Columbus could possibly have dreamed of. I searched whimsically on talcum-soft beaches for buccaneer gold. History has it that the Bahamas were the lairs of infamous pirates as recently as 200 years ago. Our survey party always finished its techniques before any gold showed up. Sometimes, though, they would wander far afield and not return before darkness. That meant spending the night anchored in what conditions were available, as a night take-off is dangerous from waters underlined by coral reefs.

An auxiliary plant furnished enough power for lights and allowed operation of the electrically equipped galley and the radio compass which we kept tuned to weather reports. Some member of the crew was required to stand watch during the night. We would usually place two lights on the beach, one behind the other, in order to tell if the big amphib were dragging anchor as a result of the breezes. First one wing float and then the other would gently smack the water, while the pitch and roll of the Albatross at anchor induced slumber.

Take-offs are a real thrill when the Albatross is overloaded. This is where JATO came in handy. Four of the units can be electrically fired at one time giving the effect of two additional engines for a period of 14 seconds. This is enough time to lift the machine off the water even in the severest seas. JATO was actually vital in extreme load take-offs when evacuating in the face of hurricanes. During approach of such weather, the water around the small islands gets nasty. Occasionally, JATO meant the difference between salvaging priceless scientific equipment and abandoning it to the ravages of the storm.

Month after month went by and I came to feel at home on the Old Spanish Main. Most of my 4,500 hours' flying time have been logged over its moody reaches. And what a curious turn of history that we who were seeking to set up exploration for new frontiers of our times were cast in the setting of those who found the new world for us. I hope this circumstance may connote as much for the future as did the arrival of the little ships long ago.

Of one thing we may be sure—if this thing is to be, it will result from the many various efforts of many men performing many various details with faith that their aggregate toil will triumph in space. And this, I can tell you, a boy out of Kansas considers life to have been good to him that his path lay in such a setting; that he had a ship as adequate to its tasks as was the vessel whose deck Columbus trod; and comrades who understood their mission as American airmen. END

TRENDS

INCREASED interest in personal and business flying was indicated by a sharp jump in student and pilot certificates issued in 1957 as compared to 1956. Student pilots increased by 78 per cent, private pilot certificates by 48 per cent, and commercial pilot certificates by 95 per cent. The trend is up!

Barns Intrigue Me

(Continued from page 29)

was it? On reaching the top of the stairs, one eager stare through the gloom told me the answer to the first two questions was an emphatic *Yes!* As to its make, I wasn't sure, but of one thing I was certain: This aeroplane had to be mine!

The farmer said the plane had been in his barn at least 40 years and had belonged to his former brother-in-law, Earl Fritts, whom he hadn't seen in almost that long. Some of the struts were wrapped in a copy of "The World," dated New York City, Wednesday, June 4, 1913.

We pulled an endless number of dusty parts out of racks, shelves and bins. I was astounded that everything was in such good condition. The varnish on the wing struts was perfect. The brace wires and fittings were of course rusted beyond use, but they were intact, so that copies easily could be made. The fittings in which the struts terminated were made of cast aluminum and in perfect shape.

I cautiously worked the conversation around to the question whether Mr. Taylor would sell the machine. It developed that he was tired of having it around and named a price I was willing to pay. We started loading any parts which would fit into my car, and I left with soaring spirit and a promise to return with suitable means for carrying the remainder of the plane home.

As I drove down the road to keep a business appointment I found myself with thoroughly mixed emotions: Happy because I had finally latched onto an authentic antique aeroplane; unhappy because I had no idea what sort of a flying machine it was. Then I remembered that my friend, Henry Kleckler, Glen Curtiss' personal mechanic from 1907 to 1921 and credited with being the "Father of the

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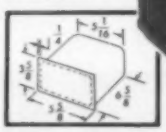

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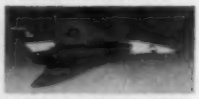

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SIC ITUR AD ASTRA
45e Ascension and the first made in America January 9th 1793 at Philadelphia 39°36' N. Latitude by M. J. P. Blanchard.
45e ascension et la premiere faite en Amerique le 9 Janvier 1793 a Philadelphie 39 36 Latitude N. par. M. J. P. Blanchard.

BOLD AERONAUT

PHILADELPHIA, PA., last January 9 marked the 165th anniversary of the first flight in the New World—the balloon ascension by Jean Pierre Blanchard in 1793.

Prophetically, a small dog was the "bold aeronaut's" lone passenger in the colorful yellow silk balloon "with blue and spangled basket" as it was launched from where now stands the Penn Mutual Building. Blanchard also carried an introductory "air mail" letter from President George Washington for identification. The flight ended at Woodbury, N. J., 15 miles and 46 minutes later and reached an altitude of 5,812 feet.

Observance of the event was marked with the unveiling of a plaque (above) in the Penn Mutual Building by the Aero Club of Philadelphia and presentation of a scroll by the Philadelphia Squadron of the Air Force Association.

(Continued from page 75)

OX-5 engine," lived in Bath, N. Y. He could tell me, at least, if what I had found was a Curtiss or not.

That night after hours, Mr. Kleckler, who at the age of 75 still puts in a solid day's work in his machine shop and refrigeration repair service, told me that my antique definitely was not of Curtiss origin. He said that, judging from the shape of the up-curved landing skids, it might be either a Wright "Baby Racer", (and he grimaced at the mention of that unspeakable name, Wright) or a "Thomas Pusher" which had been built right there in Bath in 1911.

There were no other authorities thereabouts to my knowledge, so I took my carload of treasures home and shortly wrote to several people whom I thought could help identify my find. Then before

they could answer, I made a trip to the New York Public Library to seek information from old tomes of Janes' "All the World's Aircraft." The 1910 edition (page 375) gave a description of a Thomas biplane that fitted my parts very well. "Aeronautics Magazine" (US) for November 1911 (pages 162-163) had a story on a Thomas "Headless Biplane," headless because it had no outriggers or head in front as did the Curtiss planes of the vintage. This article made me virtually certain that this was what I had found. Still, I was not positive.

On my return trip to the barn to pick up the rest of the airplane, I did some detective work. I asked the right questions of the right people and got a very good lead on the whereabouts of the Earl Fritts who had originally bought and flown this plane. That very night in a town only 50 miles away, I was able to locate the pioneer pilot and talk with him. When he realized the purpose of my visit and saw the so-nearly-forgotten parts of his old love, he was completely delighted, especially when he found that I intended to restore the plane to its original condition. He patted the wing struts and fittings as though they could respond to his gestures. I spent a fascinating evening perusing his scrap book and listening to him recount adventures of the early days of flying.

He told me this plane was indeed a Thomas "Headless Pusher" built in 1911 by William T., and O. W. Thomas of the Thomas Aeroplane Company, Bath, N. Y., later to become the Thomas-Morse Aircraft Company, Ithaca, N. Y., builders of the famous Thomas-Morse "Scout." We parted with his assurance that he would delight in seeing the airplane fly again and that he would help in any possible way.

This will be a labor of love, you can bet! Earl Fritts' ardor will be closely matched by mine. He wants to experience once more the thrill of taking this sensitive old girl into the air, and I want to fly the way they did in the early days, sitting out there on what must seem like nothing, with guy wires strumming an obligato to the husky roar of the guttural Max-I-Motor!

P.S. We finally found the gas tank, too, at the bottom of the silo.

And now, let Earl Fritts himself tell how it was done and the part played by the old ship that I found in the barn.

Walter Johnson's flying exhibition at the 1912 Oneonta, N. Y., County Fair, decided Frank Burnside and me that we had to learn to fly. This event took place in August and a month or two later, the two of us went to Bath, N. Y., where the Thomas brothers had their factory and school. We had a ride sitting on the wing of a Thomas plane alongside the radiator. Seat belts hadn't been thought of at that time. You just held on. We promptly signed up for a course of instructions at a fee of $250 each.

Throughout the following weeks of instruction (flying time was accumulated by minutes per flight and totaled only a few hours), I was rebuilding an old ma-

(continued on page 78)

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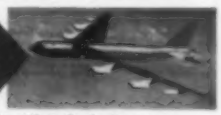

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(Continued from page 77)

chine I had purchased from the Thomas Brothers. During that period, too, I made a trip to Detroit to buy an engine that struck my fancy, called the Max-I-Motor; a 70 hp water-cooled four cylinder in-line engine, made by Max I Dingfielder.

On March 12, 1913, I flew the prescribed maneuvers required to get a pilot's certificate—including figure "8's" around pylons and two dead-stick landings to within a few feet of a blanket spread in the middle of the field. A representative of the Federation Aeronautique Internationale qualified me for Aviator's Certificate No. 213. Had it not been for the fact that earlier in that day I had broken a wheel in taxiing and had had to replace it, I would have had Certificate 212 which went to Frank Burnside instead.

Having qualified for my license, I shipped my machine to Oneonta, set it up on the Claude Taylor farm and proceeded to develop my proficiency. The Claude Taylor farm is "The Old Kerr Farm" and it was here that Eugene Ely and Walter Johnson made their first exhibition flights at Oneonta in 1911 and 1912, respectively.

I now began to build a machine of my own design, incorporating changes I thought were desirable. I had as an assistant, Arthur John Olson of Cooperstown, who was my mechanic all the time I was flying. The tail of my machine was different from the Thomas in that mine had a single instead of a double rudder. I changed the shape of the ribs as much for experiment as anything else but used no drawings. They were almost unheard of in those days. You just went ahead and built a thing as you thought it might work best. I also traded my four-cylinder Max-I-Motor for a six-cylinder 120 hp engine of the same name.

While building my second plane, I flew the original one. On one flight over the meadows I heard a terrible clatter suddenly added to the bark of the engine. Switching off the ignition I came down dead-stick to find the top of one of the pistons blown off. This machine was laid up while repairs were made to the engine in Detroit. Incidentally, all landings in those days were made dead-stick through choice. Those engines simply wouldn't idle, so rather than risk their quitting on final approach, we were taught to kill them and glide in.

I flew the old Thomas at Troy, N. Y., in the spring of 1913. On Memorial Day of that year, I flew an exhibition at Adams, Mass., the first aeroplane flight in Berkshire County, and then went back to Troy for the Fourth of July. The going exhibition rate in 1913 was $100 a flight.

During August of that year, my new machine was finished and the 120 hp Max-I-Motor installed. I tested it out on Wilcox Flats where the circus was wont to set up. This machine was very successful and flew beautifully. I promptly put it to work flying exhibitions at the Oneonta, Cooperstown and Binghamton Fairs. On its third flight at Binghamton, it broke a crankshaft at 500 feet but we came down without further damage except for a broken propeller. That ended the flying of that ship for 1913.

That winter, I decided to get set for water-borne activity and bought a Thomas flying boat hull from Walter Johnson. This hull I incorporated in my airplane.

Due to having committed myself to furnish a machine to a good friend and since there was not enough business for two machines, I turned the big new one over to him and stored the Old Thomas temporarily in the Claude Taylor barn in Oneonta. The advent of World War I made the storage permanent.

The new machine was subsequently cracked up and the usable parts salvaged and returned to me. They, too, were then stored in the Claude Taylor barn in Oneonta where the total has lain all these years. END

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Sedona and Me

(Continued from page 33)

including 91 octane on tap and will come a'running up the mile-and-a-half of mountain road with it if you just buzz the town a bit before you land. Among other activities, Joe commands the 302nd Air Rescue Squadron at Williams Air Force Base, the first Air Force Reserve flying outfit in Arizona; and owns the Oak Creek Flying Service.

Needless to say, the development of this Oak Creek Airport, perched 500 feet above Sedona with its 2,000 population, took a bit of doing. More than a decade ago, CAA had made preliminary studies of a field to serve the area. There was no site available at reasonable cost in the valley. Yet, if the airport was to be perched up on the mesa, a mountain top would have to be leveled and a road built to connect it with the town. Additionally, the folks at Sedona were dubious about strange noises. To further complicate matters, the proposed airport site lay in Yavapai County and the town of Sedona in Coconino County. However, as it stands now, the airport is sponsored by both counties; and their contributions, along with those of the federal government, made the project possible.

Community spirit got rolling. Youngsters from the Christian Indian School and the ranks of the Boy Scouts cleared the field of rocks. Citizens of Sedona turned to on the mountain road. Senator Barry Goldwater, Arizona's popular flying legislator who tested or flew operationally 59 different types of aircraft during his service in the Air Force, took an avid personal interest. In fact, the Sedona Airport is about as typical an example of American civic spirit at its best as we have ever run across.

In the course of events I had heard about the Oak Creek airport and Joe Mosier and the wonderful community spirit behind the project, but I'd never been there. Then, one day, a call from FLYING magazine requested that I make some pictures of the Oak Creek field for them and report on the progress of the airport. They didn't tell me to make an adventure of the assignment but this is what transpired.

I flew from southern California to Sedona and back with a friend and former student, George Jackson of Monrovia, Calif., in his Cessna 140. Jackson picked me up at my shack at Twentynine Palms, some 150 miles east of Los Angeles, but only after making two false starts. He took off from El Monte on a Friday afternoon and had a cowling fastener break after 15 minutes, leaving half his engine cowling flapping in the breeze. He returned to El Monte at reduced speed for repairs and took off later in the afternoon for another try at it. This time he ran into a heavy rainstorm and turned back.

He took off at dawn the following morning and landed on my sandy flight strip without incident. We took off and refueled two hours later in Prescott. Since there were a good many puddles of water, I telephoned ahead to Sedona to check the condition of the clay runway. We were advised that the strip would be

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quite muddy from a snowstorm early that morning and to check it before landing.

We flew through light rain to Sedona. The clay runway looked wet, but not hazardous. We dragged the strip and touched one wheel down lightly to see if it picked up mud. When the wheel came away clean, we decided to land. The Cessna three-pointed nicely. However, when the weight came down on the wheels, they picked up mud like a steam shovel. By the time we slid to a stop, there was a solid cover of red clay on the undersides of both wings and over the stabilizer. We could taxi only at full throttle. Each time the tires turned, they picked up more good earth until they were twice their normal size. When we climbed out of the ship, we picked up a heavy layer of mud on our shoes.

Nearly 30 minutes later, one of the men from Mosier's station turned up on foot. His car was stalled down the road. We walked and slid down to the stalled car and backed it down to a turn-around spot and then went into town to shoot some pictures and pick up background information about the airport. We also checked on bus schedules out of town.

In checking around after background on the airport, local pilots advised that there was a small taxi-way that was somewhat sandy. They used it for take-off after heavy rain. Later in the day one of them drove us back to the mountain-top in a four-wheel-drive jeep and pointed out this sandy spot. The little Cessna 140 with its cruise propeller doesn't hop into the air from a high strip like a 180. However, we decided to fly out with only one pilot aboard. Since I weigh a few pounds less than Jackson, I made the take-off. The Cessna finally staggered into the air with the stall warning blowing and mud flying from the wheels. By pre-arrangement, I headed for Cottonwood, 18 miles down the valley, where the airport was sandy and not so vulnerable to wet weather difficulties. Jackson drove a rented car down the hill.

Landing at Cottonwood was uneventful, until I climbed out of the 140. Both main tires were covered with puncture weed and only a disciple of Job will ever extract all those thorns. When Jackson showed up, we departed for Prescott and landed into a sunset rimmed with low stratus. Since the airway west to Needles is more than a bit rugged, we spent the night at Prescott, planning to take off at the crack of dawn for Twentynine Palms. About 3:00 a.m. a freezing fog rolled in and when we arrived at the flight line, the 140 had eight-inch icicles dripping from the ailerons. A pot of boiling water poured over the oil tank raised the temperature enough so that the oil would flow. Then we sat facing the sunrise for 20 minutes waiting for the frost to loosen up on the windshield.

Our two-hour flight thereafter to Twentynine Palms was uneventful. Despite the vicissitudes I wouldn't have missed the assignment for anything. Once that Arizona scenery gets in your blood you just have to go back and back. And when they get the runway hard surfaced there won't be a more attractive landing site anywhere in all the land. END

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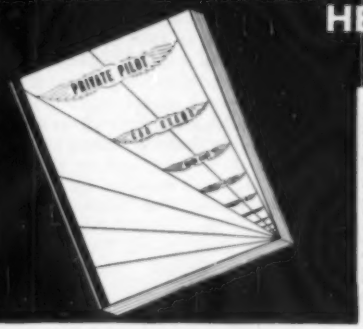

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Salute to Phoenix

(Continued from page 38)

the Civil Aeronautics Administration notified the city in 1945 that surplus money accumulated during the war years in the CPT Program could remain with the school system if such money were used to continue aviation education. CPTP had been offered at Phoenix College from 1939 to 1944.

In 1949, the present organization was formulated and the flying units integrated into the formal school curriculum. Opportunities for flight instruction are available to all high school juniors and seniors who are at least 16, and to all Phoenix College students enrolled for at least 12 semester hours. The School is certified by CAA for Basic and Advanced Ground School, Primary Flying School, Commercial Flying School, Flight Instructor School, Instrument Flying School, Multi-engine and Link Instructor Ratings.

Currently, the training equipment consists of eight Aeronca Champions, two Cessna 140's, one SNJ and a Stinson Station Wagon equipped for instrument flight instruction. Of the two Link trainers, one is used for maintenance instruction; the other is fitted with ILS, ADF and Aural Null. Seven classrooms accommodate some 200 students. Visual aids include cutaway engines and instruments, mock-ups of aircraft structures, a small wind tunnel, radio aids, a 16 mm projector and numerous charts and drawings. There is additionally a shop for aircraft and engine maintenance and overhaul. The program does not include helicopter training, due to financial considerations, but addition of a multi-engine aircraft is planned. The program has encountered little difficulty other than a short-lived hassle about funds when additional monies were needed for expansion a few years ago.

A student charge of $5 per flight hour pays for the actual operation of the aircraft. Otherwise the budget of the aviation school program is almost the same as for any other academic course. Since the School does not own airport facilities, it pays rent to the City for space at Sky Harbor Airport. This cost is figured at $25,000 annually. And the taxpayers of Phoenix are apparently satisfied that their money is wisely spent.

Airplane radio procedures hold the intense interest of students at Phoenix Flying School.

In addition to the fact that 200 of the 600 students enrolled in the aviation school take flight instruction, basic ground school courses are offered for science and agriculture credit. Photography students are flown on field trips to various areas of the state. Indoctrination tours for elementary school students also have been sponsored in the belief that air-age education should be started young. That this pays dividends is evidenced in the young students' added interest in their school work and their attitude toward education.

To insure community-wide appreciation of the program, adults are invited to evening classes. Currently, 100 adults and high school students are enrolled for evenings. The adults may earn college credits, while the students receive a quarter-unit for each two-hour evening class. No charge is made for ground school instruction. The flying time rate for adults is $7 per hour. The only requirement imposed on adult students is a 50-year age limit. (Unfair to grandfathers.)

One of the co-eds who earned a private certificate through the PTS system flying program.

The PFS staff is teaching 62 hours of ground school per week and 208 flying periods. Class sessions are held in each of the seven high schools, on the campus at Phoenix College and at the airport. Flying hours are from 8 a.m. to 5:15 p.m., six days a week, September through July. Instructors for the program are recruited from within the school system, some for part-time work. Many of these are former students now earning degrees at Arizona State in Tempe, nine miles away. All instructors are certificated by the State Department of Education and are on regular teachers' salary schedule under contract. Present permanent staff members have been with the system from four to ten years. Accredited as vocational teachers, the staff includes Director I. B. Watts, five full-time and four part-time instructors, and a secretary.

In 1956-57, the 200 students in the flying program logged more than 3,600 hours. They earned 28 private licenses, 9 commercial ratings, 7 flight instructor ratings and 4 instrument ratings. Student pilots under 21 must present permission from their parents, a requirement which Director Watts says has posed no problem. All aviation students are covered by life and accident insurance policies obtained by the School. Because of their safety record, PFS is allowed to report the total hours flown by their aircraft for an insurance rate of 30 cents an hour. This gives each student a $5,000 life policy and a $500 medical benefit.

The School's perfect safety record is the toast of its insurance companies. When

Air Force and Navy expressed interest in the Phoenix flight training methods, the insurance executive who handles the school's liability business wrote the Air Force:

"I note that in more than nine years, not one single claim for bodily injury or damage to property of others has been filed. The safety record of this school has been really fantastic . . . Earlier in their flight program, crash insurance was carried on all equipment, but after three years we recommended that such coverage be dropped. The sole reason we can give for the school's outstanding record is the constant supervision of training and maintenance."

Each student, in addition to CAA requirements, must have approximately five hours of Link time and a minimum of 50 hours of ground school instruction for even a private license. Here seems the key—thoroughness. No Phoenix graduate has ever been known to wash out as a military cadet or as an employee in civil aviation. END

Southern Sanctuary

(Continued from page 34)

dining rooms, hiking and picnic grounds, and a unique country store.

Spring-fed Robin Lake, one of 11 on the property, is the water sports center. Said to have the largest man-made inland sand beach in the world, it covers 65 acres. Later this year the National Water Ski Tourney is scheduled to take place here. Nearby Mountain Creek is a mecca for the bass and bream-hungry fisherman. One hundred boats, some with motors, are housed at lakeside in a boathouse of unique semi-circular design.

First opened to the public in 1952, the Ida Cason Callaway Gardens was established by Georgia industrialist, Cason J. Callaway, as a memorial to his mother. Open year-round and operated by a non-profit foundation, these beautiful acres in the Southern Highlands beckon the traveler to "come see." END

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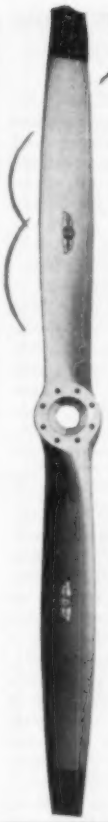

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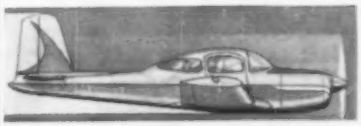

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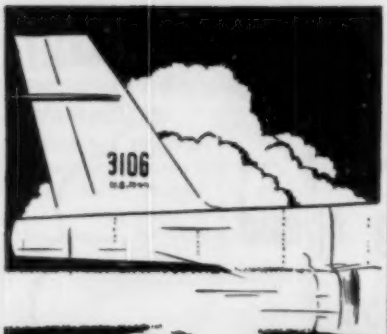

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Talk Good Like an Airman Should

(Continued from page 47)

wiched in as concisely as possible. All extraneous words must be eliminated and it will require increased patience and good manners to make communications work until it becomes a catered affair.

Pilots must remain on the frequency assigned and monitor it. Wear earphones properly with the volume up to sufficient audio. Don't start yakking immediately after switching frequencies. The traffic is too heavy these days. A pilot must "listen-before-calling." Five seconds is the accepted time for waiting. This will allow for the momentary interim between transmissions in progress. Failure to listen-before-calling is basically a goof; often results in disruption of contacts and delays the smooth flow of information between the ground and aircraft. (This does not apply to emergencies.)

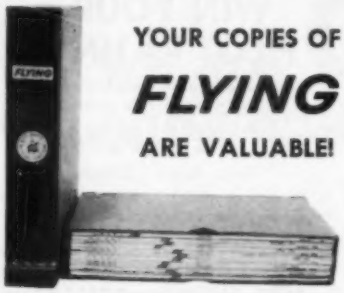
Because circuits are shared by many communicators, it is imperative that each contact be completed in the minimum time. Check switches. Develop the habit of checking the mike and frequencies set up. You can avoid calls on unintended frequencies and establish that the mike is working. Don't repeat unnecessarily. Don't repeat words twice for clarity unless in response to a request or it is known that contact is difficult. It is preferable to change frequency or await the end of a momentary burst of rain static than to try to buck heads with impossible conditions, by sending lengthy, repeated calls. When asked for a repeat or fill, give only the information requested.

Accuracy in conveying air-ground intelligence can be insured through a critical check of the read-back. Errors or doubtful words should be confirmed or repeated as necessary. (This is *necessito* when communicating with operators south of the border.) Think before talking. Prior to speaking, have a clear idea of what is to be said so re-phrasing and "ah's" are eliminated. Speak clearly. Talk directly into the microphone with lips about one-half inch away. Pitch the voice slightly higher than normal, enunciate each word clearly and distinctly at a rate slightly slower than the normal conversational speed. If, for any reason, it is necessary to change positions or turn the head, stop talking until the proper position is resumed. Position in radio communications, as in life, is everything. Be punctual at reporting times so that ground stations will not have to initiate a call.

When communications go snafu, the pilot should allow a reasonable interval between successive calls so as not to monopolize the circuit. Under such conditions, carefully monitor the frequency. Often, the pilot can hear the ground station but the ground station can't hear the pilot, or vice versa. When this happens, announce each frequency change at the time it is being made. If another aircraft can be heard, call it, and request that it relay until contact can be made. Caustic or critical remarks from aircraft should not be transmitted to any station. Say it if you wish, but don't depress the mike button. Gay witticisms and sharp repartee belong at a cocktail party; there just isn't room or time on radiotelephone.

There is only one way in which the airways can be picked bone-clean of verbal trash strewn by chatterbugs and that is through a constant self-check. Each pilot should go over his habits. By doing so, the pilot will find himself no longer fighting the mike. It will give him more time for checklists, make him more efficient, and raise his "Eye-Q" for other traffic in the area. END

"If we're over Memphis, how come the tower operator is jabbering in Spanish?"



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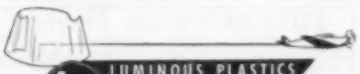

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Feb. 26-28—Third Annual AFA Jet Age Conference, Sheraton-Park Hotel, Washington, D. C.

March 13-14—2nd National Conference on Aviation Education, Hotel Mayflower, Washington, D. C.

March 13-21—Fourth Annual Miami-Cuba Air Cruise sponsored by Florida Aero Club which will also include a flight to Haiti and Jamaica. Write Harry B. Collins, Air Cruise Director, 375 N.E. 154th St., North Miami, Fla.

March 17-21—Aviation Division Conference, American Society of Mechanical Engineers, Statler-Hilton Hotel, Dallas, Tex.

March 28, 29—Oklahoma Flying Farmers, State Convention, Burlingame Hotel, Bartlesville, Okla.

April 14-16—FAI Congress convening at Institute of Aeronautical Sciences, Los Angeles, Calif.

April 16-19—American Helicopter Society 14th Annual National Forum, Sheraton Park Hotel, Washington, D. C.

April 24-27—Phoenix Spring Cruise of Flying Physicians Assoc., Inc. at Valley Ho Hotel, Scottsdale, Ariz. Flight to Grand Canyon, western party, golf, swimming. Contact: L. D. Beck, M. D. Chairman, 1626 No. Central Ave., Phoenix, Ariz.

May 4—Sportsman Pilot's Proficiency Flight No. 10 (a handicap air race) open to all pilots at Reid's Hillview Airport, San Jose, Calif. Final entry date, 26 April. Contact: Thomas C. Buck, 13106 Galway St., Garden Grove, Calif.

May 8-10—National Intercollegiate Flying Meet at Macalester College, St. Paul, Minn.

May 17—Armed Forces Day. All commands of Army, Navy, Air Force, Marine Corps, Coast Guard, National Guard, Reserve Forces and Civil Air Patrol will hold "open house."

June 12—Seventh Annual Skylady Derby, sponsored by WNAA, Topeka, Kan. Write: 904 Nickell Rd., Topeka.

July 4-6—All-American Aviation Exposition, County Airport, Pittsburgh, Penn., featuring "History of Flight," Antique Aircraft, Experimental (Homebuilt aircraft). For information, write: All-American Aviation Exposition, 210 Semple St., Pittsburgh, Penn.

July 4-8—Twelfth Annual All-Woman Air Race from Montgomery Field, San Diego, Calif., to Municipal Airport, Charleston, S. C. For information, write: AWTAR headquarters, 2611 East Spring St., Long Beach 6, Calif.

July 16-22—Jaycee Air Cruise, Philadelphia to Mexico City. For information, write: Henry Upp, Sec'y Jaycee Air Cruise Com., Atlantic Refining Bldg., Broad & Spruce Sts., Philadelphia, Penn.

Calendar items must be received at FLYING's editorial offices, 1 Park Avenue, New York 16, N. Y., three months prior to the event.

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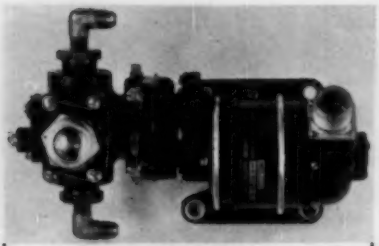

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MAILBOX

(Continued from page 8)

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IDEAS WANTED

We have a flying club started with a Piper PA-12 and plan to add a J-3 and a four-place plane later . . . We noted the ideas of club operations in your "Mailbox" column and would like more information about how various clubs operate.

Like other clubs, we have two general problems. We need additional members and we need information about how other clubs function . . .

DAVID C. KEENAN
1916 South Tyler,
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• *We know many clubs will respond to this. In the meantime, write Parks Air College, E. St. Louis, Mo., for their book on flying clubs. Price: $1.*—ED.

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We have a good flying club too. Teal is the name and we are located at Patrick Henry Airport in Hampton, Va. We are incorporated and sell two types of stock; $150 stock allowing the member to fly all club aircraft and $75 stock allowing member to fly training craft to obtain a license. In the event a member leaves, 80 per cent of his stock value is returned if he sells back to the club, 100 per cent if he gets a replacing member. We presently own two aircraft, a Stinson 108-3 and a Piper J-3. The Stinson rents for $8 per hour and the Cub for just $3.50. Dues are $5 per month.

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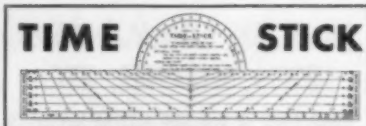

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July 1-Oct. 31, 1957 (a grant offer is a firm commitment of U.S. funds for a specific project). A total of 334 projects has been approved for Fiscal 1958. Federal funds for the year for airport improvements total $55,035,226.

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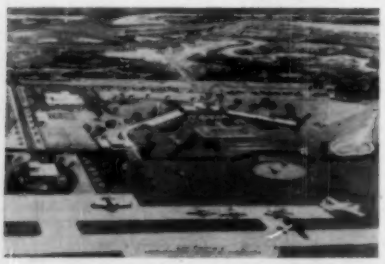
EXPANSION of production facilities for the manufacture of the Bellanca Cruisemaster at Alexander, Minn. and the appointment of E. G. Kidwell, well-known pilot and aviation career man of California, as sales manager, have been announced by Northern Aircraft, Inc. producers of the four-place executive airplane. Now shopping around for new distributors and dealers, the firm recently signed up Bert Corry, Highland Park Airport, Dallas, Tex., for the Dallas area.

ON FLORIDA'S EAST COAST, the Horizonaire Country Club is taking shape at New Smyrna Beach Municipal Airport adjacent to U. S. Highway #1. Upon completion, the Club will offer a 44-unit Skytel, a 200-capacity restaurant, tennis



courts, swimming pool and putting green, aircraft hangars and maintenance shop, to be located within walking distance of the club. Aero-Hosts, Inc. are underwriters of the enterprise.

INCREASED CRUISING SPEED of at least five mph without sacrificing rate of climb is claimed for the Cessna 170 and 172 with the new Sensenich Model M74DR Metal Propeller, according to Sensenich Corp., the manufacturer. The company also states that because of a new Sensenich-designed airfoil section the propeller has a higher endurance factor and effects an approximate three pound saving in weight.

TIMMINS AVIATION LTD., of Montreal has been added to Grumman Aircraft's list of "Gulfstream" distributors. Other marketers for the twin-engine turbo-prop executive plane are Atlantic Aviation Service, of Philadelphia; Pacific Airmotive, Burbank, Calif., and Remmert-Werner of St. Louis. All four distributors are accepting deposits on the airplane for 1959 delivery. The Gulfstream will sell for $700,000.

FLUORESCENT PLANE MARKINGS are finding favor with civilian as well as military pilots, according to Switzer Brothers Inc., Cleveland, Ohio, manufacturers of DAY-GLO fluorescent paint and Filteray, a special chemical material that filters out the harmful sun rays which cause premature fading. Without charge, Switzer will send actual swatches of Day-Glo colors and Technical Bulletin #101 which gives complete information. Address: 4732 St. Clair Ave., Cleveland.

BACK HOME IN INDIANA was never like this, particularly in December, when these Hoosiers left Columbus to join members of the Florida Aero Club for a three-day holiday at the Grand Bahama

Club at West End in the Bahamas. Awaiting customs at their destination is this happy foursome, (l to r) Allen E. Goltra, E. P. Hawes; and Mr. and Mrs. Robert L. Timbrook, who flew in in their own plane.

REPUBLIC AVIATION, through a licensing agreement with Sud Aviation, French manufacturers of the Alouette II jet helicopter, is to assemble, market and eventually produce this turbine powered helicopter for the American market. Formation of a separate Helicopter Division to handle the Alouette has been announced by Republic.

BEECH AND CESSNA have both selected the Tactair Autopilot as optional equipment for certain of their 1958 models—Beech for all of its 1958 Model J Bonanzas, and Cessna for its new 1958 Skylane, 182 and 180 models. CAA-approved, the Tactair autopilot weighs less than 12 lbs. installed, and uses pneumatics both for sensing of altitude changes and actuation of the controls.

THE ROCKET-LIKE TUBES extending from the jet engines on this prototype Boeing 707 are the latest version of Boeing-developed sound-suppressors designed to muffle the noise of the jets and change the character of the sound. When first

of the commercial 707's (now in flight test stage) goes into airline operation, these sound-suppressors are being counted upon to make it more comfortable for people living in the vicinity of the large airports they will use.

RECENTLY NAMED distributor and service center for Collins Radio equipment, the Aviation Division of Spartan Aircraft Co., in Tulsa, is setting up a dealership plan to cover the market areas assigned to it. These include the states of Oklahoma, New Mexico, Arkansas, Georgia, Alabama, Mississippi and Texas Panhandle area.

UNDER TERMS of a revised aircraft float licensing agreement between Bristol Aircraft (Western) Ltd., Winnipeg, Canada, and Edo Corp., College Point, N. Y., Bristol will continue to manufacture Edo-designed standard and amphibious floats for deHavilland Beavers and Otters and other custom-built floats for which tooling is available in Canada. Canadian requirements for all Cessna and Piper float models will be supplied by Edo through their College Point facilities.

JOHN ROTH, (of Lancaster, Pa.) a Junior at M.I.T., winner of the 1957 American Rocket Society-Chrysler Corp., Student Award, was presented with a check for $1,000 by Dr. Wernher von Braun (2nd from left) at the Society's Honors

Night dinner. Roth, a physics major, won the award for developing a new method of measuring rocket exhaust velocity. At right is Maj. Gen. J. B. Medaris, Commander, Army Ballistic Missile Agency, and (extreme left) Chrysler Corp.'s I. J. Minett.

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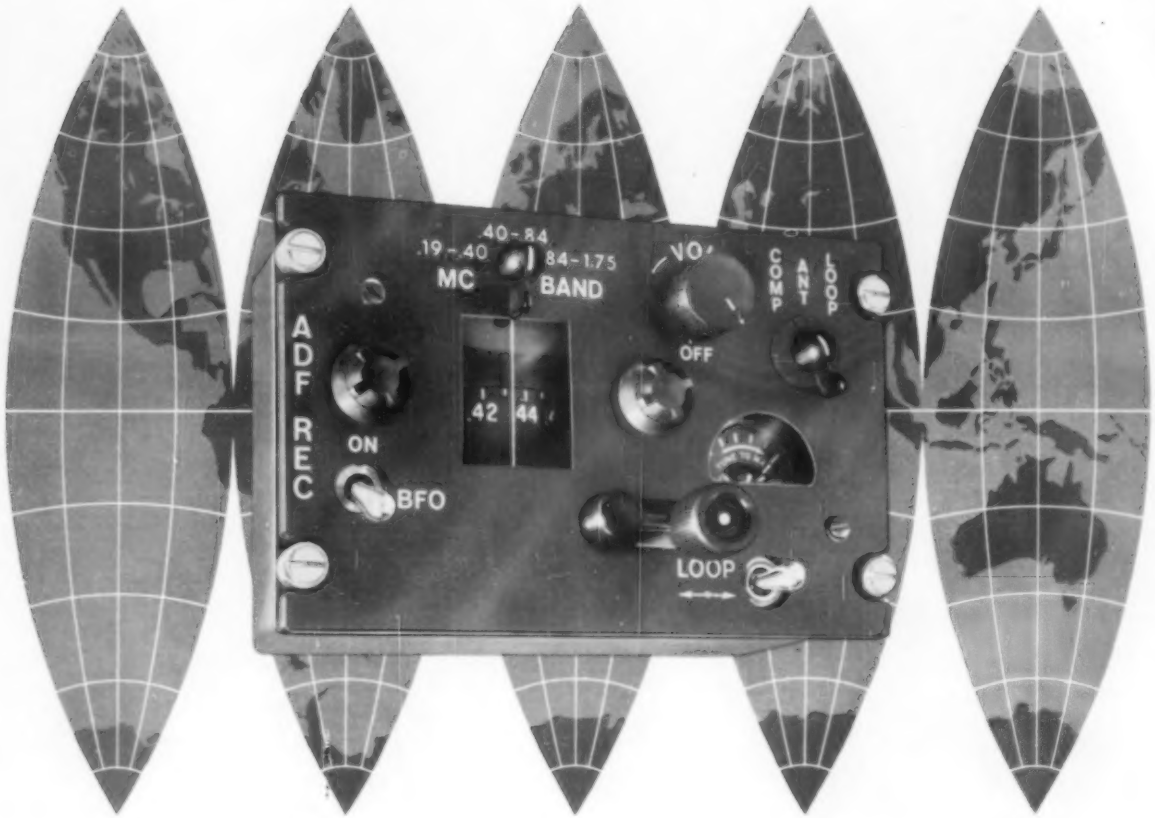

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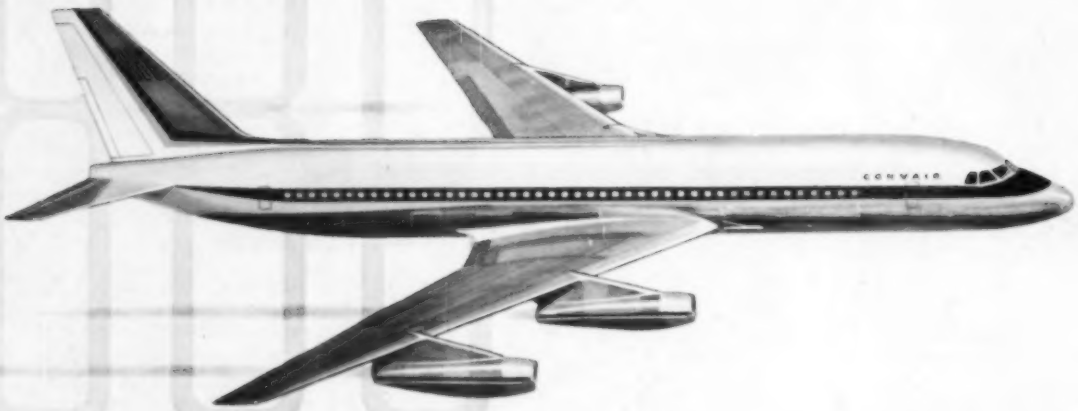

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